No. 3

REPORT on the Sanitation of Beau Bassin, Rose Hill, Quatre Bornes, Phœnix, Vacoas and Curepipe.

By

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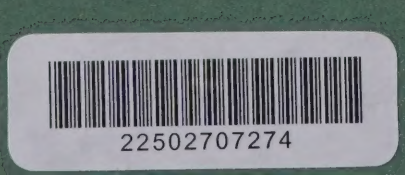
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REPORT

THE SANITATION OF BEAU BASSIN, ROSE HILL, QUATRE BORNES, PHŒNIX, VACOAS AND CUREPIPE.

No. 144/R/54

GOVERNMENT HOUSE,
PORT LOUIS,
21st July, 1921.

THE HONOURABLE THE COLONIAL SECRETARY.

SIR,—Since completing my report on Port Louis, I have, for the most part, been engaged on a sanitary survey of the six townships known respectively as Beau Bassin, Rose Hill, Quatre Bornes, Phœnix, Vacoas and Curepipe.

I have now the honour to submit a report on the state of these centres of population and to make certain recommendations regarding them. In an interim report of this kind, intended for local perusal, it appears unnecessary to enter into a full description of this chain of interesting and picturesque towns, all of which partake more or less of the "garden" character and all of which possess many features in common.

Population.

Mr. Walter, whose work on the Census is of great value from a hygienic standpoint, has given me the latest figures as regards the population of these places. They are here compared with those of 1911. The list is subject to final revision.

	1921	1911
Beau Bassin (including Asylum and Prisons)	9,392	8,336
Rose Hill (including Ebène)	7,666	7,498
Quatre Bornes	7,539	6,345
Phœnix and Vacoas	16,924	6,153*
Curepipe	19,504	17,173

Description of townships.

The towns are all laid out more or less on the same plan. On either side of the main road there is a single line of unimpressive buildings chiefly occupied as shops and to each of which a small yard is attached. In certain instances the same arrangement is found along branch roads and, as a rule, there are in addition odd shops or small clusters of shops, usually tenanted by Chinamen, scattered about elsewhere.

Spreading out in every direction from what may be called the commercial cores are the residential areas containing privates houses of various types standing in their own grounds which are sometimes extensive and often very attractive. These residential areas, however, also include the huts and shanties of Indians and Creoles, dotted about anywhere and often in close proximity to plots of sugar cane, the cultivation of sugar cane being permitted within the township limits, a matter to which allusion will again be made. Not only so but in certain places there are Indian camps belonging to sugar estates and there are also Indian locations usually shrouded by trees and constituting, as will be seen, distinctly insanitary areas. Each township also contains churches, schools and other public institutions while there is also a limited number of establishments connected with the life and activities of the inhabitants, for example bakehouses, aerated water factories, ice factories, motor repair works and so forth.

No racial segregation.

Curepipe, special features of :—

Curepipe and Phœnix differ somewhat from the other townships. The former is more of a town and its commercial quarter is on more ambitious lines and possesses buildings of a higher class though many of the structures in its main street are quite unworthy of their setting. Unfortunately also, and quite unpardonably, Curepipe possesses four distinct slum areas. Close to Curepipe is the abandoned military camp with its excellent barracks, in the main untenanted. Phœnix, or rather a part of it, commonly but erroneously supposed to belong to Vacoas is the active military centre and so is rather a place apart while the presence of golf links and other recreation grounds gives it a more open aspect than any of the other townships possess. Floreal, on the north western slope of Trou aux Cerfs has not yet been much developed. It is entirely residential and contains only a few houses, nearly all of which are of the better class. It may be regarded as an offshoot of Vacoas.

Phœnix, special features of :—

Floreal.

While it is true that a considerable gap intervenes between Quatre Bornes and Phœnix there can be no doubt that from a sanitary point of view, it is best to consider all these towns as one and indivisible. They have many connecting links in the shape of the railway, roads, streams, irrigation, canals

A single urban area.

* The area included under the term Vacoas has been considerably extended for the purposes of the 1921 census.

and drains. The chief source of water supply in every case is the Mare-aux-Vacoas reservoir. Several share the same Engrais for the disposal of their night soil and refuse. Save for a small portion of Curepipe their surface drainage runs in the same direction. Cemeteries in certain cases are used in common, and the sanitary problems with which they are faced are remarkably similar in each case.

As a matter of fact, Beau Bassin and Rose Hill now form, for all practical purposes, a single community while Quatre Bornes merges with Rose-Hill. Phœnix, as stated, is separated by open cultivated country from Quatre Bornes but it adjoins Vacoas, there being no real distinction between them. The Railway forms an artificial dividing line. Curepipe, it is true, stands somewhat aloof at the summit of the chain but even so there are houses dotted all the way between it and Phœnix. To all intents and purposes, therefore, there is one broad inhabited strip reaching from Beau Bassin to Curepipe, the presence of which is due more to the malarial parasite that to any other cause, for these uplands only began to be seriously peopled after the great outbreak of fever in the late sixties of the last century.

Local Boards.

The affairs of most of these townships, including sanitary administration is in the hands of local Boards of Commissioners, each of which possesses a Chairman, Secretary and an Inspector. The Curepipe Board has, in addition an Architect.

Thus there is one Board for both Beau Bassin and Rose Hill, another for Quatre Bornes and another for Curepipe. The Beau Bassin-Rose Hill Board appears to take a more active share in sanitary work than the others and has one unqualified sanitary inspector and two sanitary guards. Phœnix and Vacoas are not under a Board and the sanitary control of their areas is vested in the Medical and Health Department.

The latter also possesses powers of inspection in the other areas and for this purpose there is a Sanitary Warden whose duties extend to the six townships and a certain number of Sanitary Inspectors and Sanitary Guards, none of whom hold any sanitary qualifications.

Dual control.

In fact, save at Phœnix and Vacoas, the position is very much the same as in Port Louis. There is a kind of dual control and a better method of hampering work could not well be devised. According to existing Ordinances and Regulations the Boards are responsible for the upkeep and repair of certain works in their areas while Government is responsible for certain other works. The Sanitary Warden and his inspectors and the Chief Sanitary Officer are the representatives of Government. I find that these Ordinances and Regulations form a bone of contention and that sanitary work has largely degenerated into a constant warfare between two opposing forces. Moreover it is rarely, as far as I can discover, that anything is ever accomplished within a reasonable time. It must never be forgotten that tropical sanitation is a matter of minutes and hours, not of days, weeks or months. In Mauritius I regret to say one must add " or years " though it is hardly credible that such a state of matters can exist. Yet it is only too true. The usual course followed is that a Sanitary Inspector reports a nuisance to the Sanitary Warden. The Sanitary Warden reports it to the Chief Sanitary Officer, the

Dangerous delays.

Chief Sanitary Officer reports it to the Director, Medical and Health Department. The latter communicates with the Chairman of the Board. The Chairman consults with the Secretary and, if necessary, with other members. The Board being human and averse to spending money on what is looked upon as unremunerative work, or disliking to offend someone, or because it has not the necessary funds at hand, or for some other reason, temporises and the correspondence begins again in reverse order. So the matter drags on and meanwhile mosquitoes may be breeding out, flies may be multiplying, filth may be accumulating, people may be falling ill, death may be claiming its victims.

Both sides may be to blame. So acute has this strife of " meum et tuum " become that one or other authority will frequently permit a serious nuisance to develop while it quibbles over some legal point or endeavours to bring force to bear on the other party while its proper course should be to carry out the work itself at once and have the financial responsibility settled later. The main issue, the true significance and value of sanitary work, is ignored in this unfortunate strife and the public interest suffers.

Failure of sanitary administration.

I greatly regret having to draw attention to this matter but the failure of sanitary administration in Mauritius will never be understood unless the fact be grasped that there is very little true administration at all in places where this hopeless dual control exists.

Concrete examples.

It is, I think, well to give chapter and verse for my contention and so I submit two samples of correspondence in relation to the abatement or rather the perpetuation of nuisances.

I.—LIST OF NUISANCES

For reference to the Chairman of the Board of Commissioners.

Stagnation of surplus water in vicinity of Public Fountain affording breeding places for mosquitœs.	To construct an absorption pit to receive the surplus water of the said fountain. The pit shall be 6 feet deep 4 × 4 feet square with raised edges of at least 6 inches above the level of the ground and provided with a watertight proof cover so as to exclude rain and dead leaves.
Signed 14/9/16 Officer in charge.....	Signed Sanitary Warden.....

Control.—Not complied with on 19.10.16. Attention of Local Board called to

Not complied with on 6.12.16.
Same state on 9.12.16.—Letter to Local Board.
Letter from Chairman Local Board
To the Hon. Director Medical and Health Department.

Sir,—With reference to your letter.....dated.....I have the honour to inform you that the absorption pit at.....fountain has not been constructed because the Board think that such a work is not necessary as the discharge drain from the fountain has a very good slope and leads away the waste waters very easily.

2. Moreover this absorption pit, if constructed might become a serious nuisance, for the soil there is composed of clay which will keep the water thus affording a breeding place for mosquitoes in a district near which Costalis have been lately found.

I am, &c.,

Signed
22.12.16 C. of Board of Commissioners.....

Letter to Chairman Local Board

To Chairman, Board of Commissioners.....

Sir,—With reference to your letter.....of the....., I have the honour to inform you that the Sanitary Authority reports that the means existing for the disposal of the waste waters from the fountain in question do not answer the requirements.

He further points out that the drain referred to in your letter is rudimentary and that it was overgrown with grass at the time your attention was called to the nuisance.

If the Board consider that an absorption pit will not prove satisfactory, a proper cemented drain may be provided to lead the water to the nearest stream.

I have, &c.,

25.1.17 Signed
Ag. Director.....

Sy. Warden (...)—Referred.—Please see Director's letter.
1.2.17 Signed,.....—C.S.O.
S. I..... Signed S.W..... 5/2.
Sy. Warden (. . .) Matters not improved yet. The drain all along its course is blocked up with weeds, &c., allowing water to stagnate and where mosquito larvæ can be seen.
19.2.17 Signed,.....—Sy. Insp.
S. I..... Signed S.W..... 9/4.
C.S.O.—A rough trench has been dug from the fountain on a length of about 100 feet leading to an absorption pit.
The pit not being provided with raised edges, the head is able to be blocked up in a very short time.
11.6.17 Signed,.....—Sy. Insp.
Papers disappeared since.—Reported again *vide* list annexed.

LIST OF NUISANCES

Stagnation of water on premises.. and in discharge drain of Public Fountain, owing to the defective condition of the discharge drain around Fountain, the filthy state of its vicinity and drain, and complete obstruction of the filter bed of pit.

2. Drain overshaded with bamboo.

To cause the said drain to be repaired, joints cemented and cleared of filth, &c., the filter bed on the absorption pit provided with 5 inches edges above the level of the ground, and a mosquito proof cover.

2. Bamboo hedges trimmed so as to allow the sun's rays to reach the ground.

Signed
19.8.18 Officer in charge.....

Signed
Sy. Warden.....

Papers disappeared—Reported again *vide* list annexed.

LIST OF NUISANCES

Same as above

9.3.20 Signed
Officer in charge.....

Signed
Sanitary Authority.....

Control.—Not complied with and visited by Warden.
Reminder to Local Board on 5,5.20
Same state on 2.6.20
2nd Reminder to Local Board 4.6.20
No improvement 20.7.20
3rd Reminder to Local Board on 27.7.20
No improvement 20.8.20
Papers disappeared since
Reported again *vide* List annexed.

LIST OF NUISANCES

Fresh list issued on 10.12.20
Control.—Not complied with on 28.1.21
Reminder to Local Board on 31.1.21
Same state on 3.3.21
2nd Reminder to Local Board on 7.5.21
No improvement on 7.4.21
Schedule C issued on 9.6.21 for service by Usher
Papers not returned.

30.6.21

Signed
Sy. Insp.....

II.—LIST OF NUISANCES

For reference to The Chairman Board of Commissioners.....
Description: Stagnation of foul liquid in side drain in front of premises.....affording breeding places for mosquitoes.
Requirements: To cause a paved and cemented drain leading the water to the underground drain crossing.....Street. Dated 22.12.16.
Not attended to up to 2.2.17
Visited by Medical Director and Warden on 25. 4.17
Departmental M.P. attached to foregoing correspondence.
Papers disappeared since.
Reported again *vide* List of Nuisances on 11.3.20

LIST OF NUISANCES

Fresh List issued on 11.3.20
Control.—Not complied with on 17.4.20
Reminder issued on 19.4.20 to Local Board
Matters in same state
2nd Reminder issued on 4.6.20
No improvement
3rd Reminder issued on 28.6.20
No improvement
Schedule C issued on 1.9.20 for service by Usher
Visited by Warden on 21.9.20
Visited by Medical Director and Warden on 22.9.20
Departmental M.P. attached to foregoing correspondence
Case pending before Court. (July 1921)

But it is not only Boards which are at fault. Representations made to government departments may, I am sorry to say, receive scant attention.

I have seen examples of cases dragging on from 1917 to the present date while in a recent instance an important requisition made in February of this year still awaits attention.

Moreover there is another aspect of sanitary control which must be mentioned.

An offender, committing a nuisance, is given a certain time to abate it. He fails to do so, is prosecuted, convicted and fined. The fine, however, as a rule is quite inadequate. For example the Management of a prosperous sugar estate which has allowed its Engrais to become an offence or danger to health may be fined the sum of Rs. 3. Naturally it is much easier to continue paying fines of this kind for a lengthy period than to undertake the necessary repairs. The usual fines for sanitary misdemeanours are R. 1 or Rs. 2. Occasionally, that may be adequate when the person at fault is some poor peon but magistrates must realise that offences against the public health are serious derelictions and must be prepared to make the punishment fit the crime. The same trouble has been experienced on the West Coast of Africa and as a result of strong representation on the subject the Medical and Sanitary Advisory Committee of the Colonial Office had the attention of Governors of the various Colonies directed to the importance of the question with a view to getting legal practice in this respect amended. There is such a penalty as imprisonment without the option of a fine and it is sometimes required.

Inadequacy of fines.

Action taken elsewhere.

It is only fair to state that all magistrates do not take an equally lenient view of sanitary misdemeanours.

Other factors militating against efficient service are :

Other factors preventing efficiency.

(a) The time which Sanitary Inspectors have to spend in Court giving evidence. One inspector informs me that he spends two whole days in such work every week.

(b) The fact that a Magistrate will sometimes dismiss a case unless the inspector is able to state that he has seen the nuisances forming the subject of prosecution *the day before the trial.* It is often quite impossible for him to do so and the accused person takes advantage of this loophole of escape. The nuisance, seen by the inspector several days before the trial, has not been abated but the accused states that it has been remedied since the last inspection, and the Magistrate gives him the benefit of the doubt.

(c) The fact that the unfortunate Sanitary Inspector has to serve no less than four Departments i.e. the Medical and Health Department as regards his routine work, the Public Works Department with reference to straw buildings, the Department of Agriculture in respect of Surra and the Immigration Department so far as Indian Camps are concerned. We read in Holy Writ that no man can serve two masters. Still less can he serve four.

(d) The fact that Sanitary Inspectors are badly paid considering the responsible position they hold and the temptations and dangers to which their special class of work exposes them. It must not be forgotten that Sanitary Inspectors are often, or should often be, among the first to enter premises where there are cases of serious communicable disease as, for example, plague and influenza. Yet they find it hard to live and have little to which to look forward.

Sanitary Inspectors poorly paid.

Results of faulty *régime*.

One is not surprised to find that under such a *régime* sanitary inspectors become embittered and disheartened, sanitary wardens indifferent, representatives of Boards sceptical as to the value of sanitation and disinclined to undertake responsibility, while the long-suffering community shrugs its shoulders and, where it can, has recourse to preventive inoculation.

It would be ludicrous were it not pathetic and serious and yet one feels that at first both sides must have been actuated by a desire to do their duty and that they have found it impossible of accomplishment owing to the system which has been adopted.

Necessity for complete change.

That system must terminate if any progress is to be made. The concluding part of this report will be found to deal with recommendations for the abolition of dual control and the establishment of sanitary administration on lines which have proved successful in places where the difficulties were much greater than those encountered in the Beau Bassin—Curepipe region.

Comparatively simple though the problems are the results of the present *impasse* are far from negligible as the following statistics indicate.

Death returns for 1920.

They were supplied me from the Registrar General's Department 1920.

Townships	Number of deaths due to		
	Dysentery	Typhoid fever	Malaria
Beau Bassin	17	3	21
Rose Hill	11	0	14
Quatre Bornes ...	13	1	11
Phœnix	6	2	45
Vacoas	12	0	14
Curepipe	20	1	19
Totals ...	79	7	124

These figures, be it noted, refer only to deaths. One would gather that the incidence of dysentery and malaria must be considerable. At the same time it must not be forgotten that all deaths from "fever" are classed as malaria. Amongst them there must be cases of typhoid fever. In the case of Curepipe the deaths from malaria are those of persons who have acquired the infection elsewhere. The same is probably true, at least to some extent, as regards Phœnix.

With these preliminary remarks I proceed to a consideration of the sanitary state of each of the areas in question. In most cases the inspections followed a definite course. A start was made at the railway station, which is usually in a central position. Then the commercial district i. e. the shops and yards, was visited. Thereafter visits were paid to the markets, slaughter-houses, bake-houses, cowsheds and all places associated with the preparation and sale of food and drink. The roads and drains were scrutinized. The collection and disposal of refuse and night soil formed the subject of investigation as did questions of water supply. Mosquito-breeding areas, canals and streams were explored. Indian locations and camps received attention. Schools and cemeteries were examined. Private premises were sampled as it was naturally impossible to visit them all. Finally in the offices of the Boards and Sanitary Inspectors books were inspected and details of administration studied.

Routine of inspections

In the case of Beau Bassin the large Civil Prison, the Barkly Asylum Hospital and the Lunatic Asylum were included ; at Rose Hill the Reformatory and Industrial School for boys, at Vacoas the Military Area and at Curepipe the Military Camp.

In this way it is possible to make certain that nothing essential was missed and to realize the relation of the different townships to each other.

Acknowledgment of help.

I received every assistance and help both from the officers of the Medical and Health Department, from the officials of the Boards, from the Police Officers and from the Military Authorities. The Director of Railways intended to provide special facilities for visiting stations but, owing to the strike, these were not forthcoming. The Director, Public Works Department accompanied me upon a visit paid to the filter works at La Marie and to Mare-aux-Vacoas reservoir. A considerable portion of the catchment area of the latter was traversed and the possibilities of tapping Rivière du Poste as a further source of water supply explained on the spot.

Memoranda already submitted

As in the case of Port Louis it was considered advisable to submit memoranda on especially important or pressing matters which came under notice

during the inspections. Accordingly the following were drafted and in most cases action has been taken on them :

66/R/25 of 10.5.21 : Insanitary area, Metcalfe Village
73/R/29 of 14.5.21 : Insanitary area near Beau Bassin R. Station.
74/R/30 of 14.5.21 : Alteration of gutter, Beau Bassin,
78/R/33 of 16.5.21 : Police Station, Beau Bassin.
79/R/34 of 17.5.21 : Scavenging service, Beau Bassin.
80/R/35 of 17.5.21 : Barkly Asylum.
88/R/38 of 19.5.21, 94/R/40 of 23.5.21 and 106 of 1.6.21 : Terre Rouge Canal, Mosquito nuisance
95/R/41 of 25.5.21, 96/R/42 of 25.5.21 and 121/R/46 of 10.6.21 : Rose Hill Railway Station.
103 of 31.5.21 and 125 of 14.6.21 : Schools.
110/R/43 of 6.6.21 : St. Jean Cemetery, Quatre Bornes.
123 of 14.6.21 : Mosquito nuisance, Mesnil River and Rivière Sèche.
125/R/49 of 18.6.21 : Sanitary Arrangements Royal College, Curepipe
136/R/50 of 18.9.21 : Closing of wells, Curepipe.

Communications have also been addressed to the officials of the Boards and information has been furnished on several questions. I now turn to a consideration of the individual townships.

BEAU BASSIN

Beau Bassin.

This, the first of the townships encountered in proceeding from Port Louis along the main road to Mahebourg is situated 750 feet above sea level and covers an area of 1.62 square miles.

It presents the general features already mentioned, while special points to be noted are the presence of the Plaines Wilhems and Terre Rouge Canals and the fact that the Barkly Asylum Hospital, the Lunatic Asylum and the large Civil Prison are situated in the township area.

It appears advisable to consider the conditions which came under notice in a definite order. Much said about Beau Bassin will be found to apply equally to the other townships.

Streets.

1. Streets.— There is no need here, as in Port Louis, to alter the streets. It is only along the main road that there is much traffic and though the motors tend to cut up the surface the type of road for a country town is quite satisfactory. The drains and gutters are a difficulty. In most cases they are well constructed and have an adequate fall but here and there, especially in the case of unpaved gutters there is trouble, accentuated by the fact that there are frequent disputes as to who is responsible for upkeep and cleaning. When this responsibility is definitely allocated some of the difficulty will disappear but, in certain places, unless the drains be cemented in the manner adopted throughout the Military Area, Phœnix or at Rose Belle, Grand Port, I fear there will always be a tendency to nuisance. In a small place like Beau Bassin I do not think it would be justifiable to expend large sums on such works. I would rather trust to efficient inspection and cleaning under the scheme of sanitary administration which I propose should be adopted. The drains on either side of the main road should however be reconstructed.

At one spot Mare-aux-Vacoas water pipes had been laid across a gutter in such a way that the flow therein was blocked. This has now been largely, though not completely, remedied. The remaining obstructing pipes should be altered.

Drains and gutters.

The great trouble about all earthen drains and gutters in Beau Bassin, as in the other townships, is that foul sullage waters from yards and houses are frequently conducted into them. This is quite wrong but it is difficult to remedy without a complete underground drainage system. (*vide infra.*)

Absorption pits with grease traps.

Still a great deal can be accomplished by the proper use of absorption pits fitted with simple grease boxes in the manner so frequently employed in Military Camps during the recent war. I have already introduced some of these and hope they will be multiplied. It is true they require to be constantly looked after but so does everything else in sanitary work when one is unable to rely on fool-proof contrivances.

Information regarding them has been furnished the Sanitary Authorities.

Yards, shops and houses.

2. Yards, Shops and Houses.—Most of the yards behind the shops were found to be in an insanitary condition. These yards are small and it should be easy enough for the tenants to keep them clean and tidy. All kinds of nuisances were found to exist, such as leaking water taps, choked gutters, offensive refuse lying here and there, potential and sometimes actual mosquito breeding places, wood stacks affording shelter to rats, dirty hovels of kitchens,

ruinous and badly constructed latrines which not infrequently were in a filthy condition. In one private yard, I came across a latrine without any receptacle but, fitted into the hole of the seat, was a basket constituting a nest for fowls while a fowl was actually sitting, presumably on eggs, at one end of the privy seat !

In yards owned by Chinese, fowls and ducks wandered about at will and were found in the shops and adjoining rooms as well as in the yards.

It appears there are no regulations in Mauritius as regards the keeping of fowls.

The shops themselves, though usually poorly lit, are as a rule fairly clean but small store rooms behind them were often found dirty with bed rooms opening off them.

It is fortunate that there is usually only a single line of buildings on either side of the road as otherwise the conditions present in Port Louis would have been repeated.

As it is, light and air are not excluded to any extent and there is no gross overcrowding except at some of the lodging houses where the pernicious habits of sub-letting and dividing up houses and rooms are in evidence.

Plans never submitted for sanitary approval.

Here again also one finds that no plans of houses, yards and their immediate surroundings are ever submitted for expert sanitary scrutiny and advice and hence latrines have been placed in wrong positions and various nuisances exist which might easily have been avoided.

Certain shops and store rooms had defective floors and presented conditions very favourable to rats, a disquieting state of matters considering the presence of plague in Port Louis. In many cases the Chinese ignore the regulations which were made as regards storage of wood and food-stuffs and the position of sleeping apartments, and the sanitary authorities have abandoned the apparently futile struggle of trying to keep them up to the mark. It must be understood that sanitary work in a hot climate partakes largely of the character of a campaign. If it has not the virtues of thoroughness and persistence it can accomplish little, but in order that it should possess these virtues there must be a sufficient and properly trained Staff who must be endowed with patience, tact, firmness, honesty and enthusiasm and whose efforts should be seconded by the more intelligent and better educated section of the comunity. In other words there must be a certain amount of public opinion. To this subject I hope to revert later on.

Risk of plague.

Need for public opinion.

The few barbers' shops were found fairly clean though arrangements were distinctly primitive. I find, however, that generally hair dressers make some efforts towards hygienic conditions if only because their trade will suffer if they infect their customers.

Recommendations for barbers' shops.

At the same time they require instruction and copies of the recommendations I have drafted (My 116/R/45 of 7.6.21) might, I think with advantage be placed in their shops, even if the time is not yet ripe to convert recommendations into regulations.

I am told that rain gutters are a frequent source of mosquitoes. At this time of the year they are not a nuisance but may well become so in the summer. In some tropical countries it has been found better to get rid of them altogether. I doubt if this is necessary in Mauritius and in any case, storm boards might perhaps be substituted for them.

Private houses.

The large private houses and their yards and gardens were, generally speaking, found in a fairly good condition though nuisances usually due to waste of water, were not infrequently encountered. On the other hand servant's quarters generally left a great deal to be desired. I wonder how many of the householders of Beau Bassin pay personal visits of inspection to see how those who serve them are lodged, fed and clothed and in what state the servants' latrine is kept ! Do they, I also wonder, ever take the trouble to inspect the kitchen and see how their food is prepared and what happens to kitchen refuse and sullage water ?

Servants' quarters.

In these matters it is not the case that " where ignorance is bliss 'tis folly to be wise." After the first shock benefit is likely to accrue from such visits. Servants will, so to speak, live up to a master or mistress who looks after their welfare and who is particular about the kitchen and the sanitary state of the compound. If only the inhabitants would realize this truth and help the authorities the cares and worries of sanitary inspectors would be greatly lightened and there would be less illness and fewer deaths.

Indian camps and locations.

3. INDIAN CAMPS AND LOCATIONS.—At a place called "Jadoo's property" a most insanitary state of matters was discovered. Here there is a yard devoted to the preparation of cattle dung for manure. The whole place was in a filthy state and a drain ended in a large pool which at any time might breed out mosquitoes. There was a cowshed in a bad condition and

altogether the area had become a nuisance and danger, a veritable nursery for flies.

Metcalfe.

The larger Indian village called Metcalfe received special attention as a complaint had been registered against it. The site which it occupies is very unsuitable for it has never been properly cleared and is littered with stones and rocks. Hence Metcalfe is a degree worse than most of the Indian villages seen but otherwise it presents their usual faults. It is not laid out on any definite plan. Houses, latrines and cow sheds are scattered about haphazard, there are many loose stone walls which harbour rats, there are far too many trees and there is a certain amount of undergrowth. It is a typical example of what happens when a place is allowed to be built without any advice being obtained from sanitary engineers and health officers.

It might be worse, for at least the compounds are large, the houses are separate and some of them have been fairly well built but, even so, it is disheartening to see the wholly unsuitable type of latrine, the rudimentary cow-sheds, the manure heaps, and here and there badly constructed absorption pits which have ceased to function properly.

Remedial measures.

The best thing to do would be to clear out the whole place and construct a model village elsewhere. Unfortunately the cost would be prohibitive and so, after consultation with the Honourable the Colonial Secretary and representatives from the Medical and Health Department, the Public Works Department and the Police, it has been decided on the Colonial Secretary's suggestion to recommend that, as a first step, the system of permitting large animals such as cattle and goats to be housed within the village, should be terminated and that a special area should be reserved, in proximity to but separate from the village, in which these animals will be kept under sanitary conditions and with appropriate protection and supervision.

This alone will bring about a great change and will be a useful measure in connection with the control of the milk supply. It will then also be possible to deal in a simple, cheap but effective method with the manure. The Honourable the Colonial Secretary has now the matter in hand and his wide experience of conditions in Ceylon should prove of special value.

Headman system

As regards other measures I have suggested that, for all these Indian locations, the Headman system should be adopted, in other words that a Headman, chosen by the people themselves, as one whom they respect and trust, should be appointed. It will be his duty to see that order is kept in the village and that it is maintained in a cleanly state and he will be responsible for reporting nuisances and cases of illness. The system works well in the case of peoples far less intelligent than the Indians of Mauritius and could be gradually developed if found successful.

It is true that, owing to differences in race and religion, difficulties may be encountered but at least this method of administration merits a trial and I do not see in what other way improvement can be effected.

By degrees also reconstruction work will be carried out in the Metcalfe area, in the way of clearing, cleaning up, altering insanitary dwellings and introducing properly made absorption pits. Further, experimental trials will be made of certain latrine systems. There has been a great development recently in forms of latrines adapted for the use of native populations in the tropics. In the report on Port Louis I referred to "fuming pits" and there is a possibility that these might be succesefully used in Indian villages, especially if facilities for the practice of "abdust" (lavage) be provided (see p. 33). This can be arranged without any great difficulty. The question of the introduction of "aqua privies," now largely employed for coolies in India, merits consideration and there are other devices which need not be considered in a report of this kind but which will form the subject of discussion and, as stated, of experimental trial.

Reconstruction a gradual process.

Meanwhile the latrine buildings can be remodelled and efforts made to reduce the incidence of ankylostomiasis. One does not expect miracles to be achieved, but patient, persistent work can accomplish wonders. In my No. 122 of 13.6.21 (M.P. 4687/20) I gave figures showing the remarkable results which have followed improvements effected in coolie camps in Sumatra. (Appendix II.) It is true that ordinary Indian villages are more difficult to handle than camp lines, but difficulties exist to be overcome, and not to be regarded as insurmountable. "Slow but sure" is a good motto to adopt in these cases.

Cow-sheds.

4. Cow-Sheds.—These vary somewhat in size and construction but they are all insanitary places with bad floors, faulty drainage, fly-breeding manure pits and offensive urine sumps. Apart from the scheme of reconstruction mentioned under 3 it is difficult to know what to do with them as the owners are usually poor and cannot afford to carry out extensive repairs.

There has, I note, been much correspondence and discussion as regards floors and the question has been held over pending any suggestions I had to make. It seemed to me the only way of settling the matter was to lay down experimental floors and have them tested. Thanks to the kind help of the Director of Agriculture it has been possible to prepare under cover four types of flooring.

Experimental trial of floors.

(a) That in common use consisting of large stones bedded irregularly in the ground.

(b) The so-called " ciment batard " made usually of a mixture of broken stones, sand, lime and red earth.

(c) A cow-dung floor of the usual Indian type.

(d) A special cow-dung floor in which the earth and dung are worked up with a little kerosene. Animals will be placed on these floors and the suitability and permanency of the latter duly noted.

There is no doubt that (a) is bad. I fear (b) is rather too expensive and that it will soon fall into disrepair so that the last state of the floor will be worse than the first unless it is frequently renewed. As regards (c) though there is some nuisance produced when a cowdung floor is being made, such a floor if properly laid and kept clean is by no means insanitary. If only ant-hill earth was available in Mauritius I would not hesitate to recommend it for, in Africa, excellent hard floors which do not readily crack can be constructed from ant-hill earth and cow-dung. If earth resembling ant-hill earth can be found in Mauritius the problem would be solved.

For the present I think (d) is likely to prove the best. It has the virtues of (c) for the small quantity of kerosene used will not add greatly to the expense while it tends to keep the floor sweet and makes the mixture of dung and earth more adhesive.

Instead of urine sumps, absorption pits might be employed in many places and the manure might be stacked and treated as recommended in my Port Louis Report in connection with the slaughter house manure.

Food and Drink.

5. PREPARATION AND SALE OF FOOD AND DRINK.—There is not much to be noted under this heading so far as Beau Bassin is concerned.

The solitary Bakehouse was found in fairly good condition but possessed several faults i.e. a bath room and a latrine communicated with the bake house and a dwelling house was situated above the bakery. When the new regulations are introduced it will be found that such arrangements are not permitted.

As regards retail shops I would merely point out that some of the vegetables exposed for sale are frequently far from being fresh though not actually decayed.

There are no dairies, the milk supply coming from outside the town. The same remarks apply to it as at Port Louis.

Market.

Market.—This was found in a good state of repair. The tables on which meat and fish are exposed are satisfactory and tripe is sold in a separate building. A railing is required round the butchers' tables to exclude dogs and to prevent buyers handling meat and otherwise polluting it. A proper sanitary refuse bin should be provided. (This has now been done).

There is no slaughter house at Beau Bassin.

Water supply.

6. WATER SUPPLY.—The greater part of Beau Bassin is furnished with Mare-aux-Vacoas water. The lower part, however, has to depend on the Plaines Wilhems Canal the water of which is liable to contamination. Steps should be taken to make the Mare-aux-Vacoas supply universal. There is a great waste of water, both from public fountains and on private premises. The former can only be checked by the provision of proper taps. The latter is to be met by the installation of water meters.

Night-soil service.

7. NIGHT-SOIL-COLLECTION, REMOVAL AND DISPOSAL.—There is no water-carriage system in Beau Bassin save in the case of a few private premises and the Lunatic Asylum where septic tanks have been installed. The conservancy work is in the hands of the Stanley Sugar Estates Co. there being a sub-contractor for Beau Bassin and 4 carts are employed for the 890 tubs handled. The removal in a few cases is a daily one, in the great majority the tubs are only removed thrice a week. This alone is enough to condemn the system and in any case the conditions are very unsatisfactory. I have already mentioned an extreme case where the latrine was being used as a fowl-house but nowhere did I find the receptacles fitting closely, as they should, below the opening in the latrine seat. As a result nearly all the latrine floors were fouled with urine and often with excrement. The tubs were usually filthy and indeed the conditions were precisely the same as those encountered at Port Louis. In one common lodging house there was only one tub for the use of 5 adults and 12 children and here the removal was thrice weekly. As

Defective latrines.

a matter of fact many tubs are not removed at all. Their contents are emptied into other tubs and, without being cleaned in any way, they are pushed back into latrines the floors of which are generally defective and the smell from which is distinctly nauseating. Flies readily gain access to the pail contents, the soil round the latrines is polluted and indeed every fault associated with a badly devised and badly conducted system is in evidence. There is one public latrine near the station. It has no catch pit for urine which accordingly flows into an open drain. All things considered the carts are not such a nuisance as might be expected, chiefly because they are closed and the dark interiors help to keep away flies but, being of wood, their sides and floors get dirty. In the hot summer I have little doubt but that they are escorted by winged hosts. Indeed I am told that is the case.

Engrais.

The Engrais, an open one, is situated at Cerné. As Engrais go, and I have now seen a good many, that at Cerné is fairly well managed but it breeds flies like all the others and is part of a pernicious and dangerous system with which I will deal more fully in this report and which must be abolished in the interests of the public health.

Scavenging service.

8. Refuse Collection, Removal and Disposal of.—I am glad to be able to report that the scavenging service, also carried out by the Stanley Sugar Estates Co. is, on the whole well done. Thirteen refuse carts with 39 men are employed and the material is taken to the Engrais to be mixed with the tub contents. There is not much accumulation of it there. It seems to be rapidly used up. Beau Bassin, however, possesses no public refuse bins and very few private ones and as a result the streets at certain times of the day, and more especially the lanes and byways, exhibit collections of rubbish and garbage which get blown about if there is anything of a wind.

Railway Station.

9. Railway Station.—In the first, unpublished, part of his report, Dr. Kendrick commented severely and with goodreason on the insanitary state of the railway stations in Mauritius. That at Beau Bassin is not as bad as some of the others which I shall describe in due course. In the women's latrine the bucket does not fit the seat. The urinals are of a bad type. Here, as elsewhere, it seems never to have been realized that the different classes of the travelling public have entirely different customs in respect to certain aspects of sanitation. There is a large Indian and a considerable Mahomedan population in Mauritius but no effort has been made at the railway stations, save at Port Louis where there is water-carriage, to cater for their sanitary requirements. At every railway station it should be possible to have a latrine for those who do not practice lavage and another for those who do.

Such an arrangement would be greatly appreciated and would prevent some of the nuisances I have seen. It is true that until a water-carriage system is installed nothing very drastic can be accomplished but there would be no difficulty in making the above provision into the details of which I need scarcely enter and which I propose to discuss fully with the Director of Railways and the Director, Public Works Department.

Value of sawdust urinals.

I have recommended that so-called "sawdust urinals" be employed. They are in use at the Civil Prison, Beau Bassin and the Reformatory, Rose Hill and have proved highly successful. One should certainly be erected at Beau Bassin Railway Station.

An area covered with vegetation and used as a public latrine was found beside the railway line close to the railway crossing. Attention was directed to it and it has been cleared and cleaned up.

Schools.

10. Schools.—Two schools were inspected :—

(a) *Boys' Government School.* The number of pupils is 247, the average attendance 176 ; the majority of absences being due to illness of which "fever" and influenza were stated to be the chief. The sanitary arrangements are unsatisfactory. Attention has been directed to the matter.

(b) *Girls' Government School.* Number of pupils 155, Average attendance 110. The sanitary conditions were somewhat better than at the boys' school. The teaching of hygiene in these schools, as at present conducted, serves no useful purpose. This question will be considered separately.

Civil Prison.

11. Civil Prison.—It was a pleasure to visit this institution. In the first place it is the best prison I have ever seen in the tropics, in the second it is kept in excellent sanitary condition. This is only as it should be, considering that it is under special discipline and that there is ample labour but, even so, the prison at Beau Bassin deserves a special word of commendation. Still it is necessary to refer to the fact that the ventilation of the hospital is defective. I understand it is to be remedied.

The night-soil service is well conducted but an improvement will be effected when the septic tank which is in process of construction, is brought into operation for even the best-managed dry system of conservancy is not free from the danger of flies.

The question of providing a small Quarantine Block merits attention.

Barkly Asylum.

12. Barkly Asylum Hospital and Lunatic Asylum.— These are merely mentioned as they will be dealt with later when a special report on all the hospitals in Mauritius is submitted. It may merely here be said that the

Lunatic Asylum.

conditions at the Lunatic Asylum are, generally speaking, as good as those at the Barkly Asylum are the reverse.

ROSE HILL

Rose Hill.

Rose Hill covers an area of about 1·305 square miles and presents general and special features very similar to those at Beau Bassin. The division between the two townships is wholly artificial and their essential unity was long ago recognised when they were united under one local Board. In certain particulars, however, Rose Hill differs from Beau Bassin. For example it possesses a slaughter house while in place of the Prison there is a Reformatory and an Industrial School.

Streets.

1. Streets.—There is nothing special to note. As at Beau Bassin the main drains on either side of the Royal Route should be lined with cement concrete.

Yards, shops and houses.

2. Yards, Shops and Houses.—Rose Hill in these respects is practically a replica of Beau Bassin. Generally speaking, however, the premises forming the commercial core have more light and air than those in the latter township. Back-to-back premises are quite exceptionnal. Whenever found they should, of course, be abolished.

Some of the Chinese yards were found to be exceptionally filthy. In one of them old corks were being used for wine bottles. This use of old corks is most undesirable as they are often dirty, having been lying about amongst dust and debris. During enquiries at Rose Hill it was found that there are no

No regulations with respect to workshops.

regulations in Mauritius as regards workshops. It is true that it is useless framing regulations until they can be properly enforced, but the fact above-mentioned should be borne in mind, more especially however, in connection with Port Louis.

A matter not mentioned when dealing with Beau Bassin and in evidence there, as at Rose Hill, was the number of yards in which old cans and fragments of broken bottles were found. After rain these may easily become mosquito nurseries. During the time Sir Ronald Ross was in Mauritius active measures were taken to abate this form of nuisance but now it again flourishes.

Necessity for anti-mosquito measures.

The special legislation to which I referred in my Port Louis report, combined, of course, with *immediate* action as regards any larvæ or pupæ found, is the only way of getting something more or less permanent done. It is in Rose Hill especially that the evil results of permitting cane cultivation within the precincts of the township are especially apparent. These small cane patches simply serve as public latrines and also as receptacles for all kinds of refuse. I understand this question, when previously brought forward, produced an outcry. I can only say that, in my opinion, no cane cultivation should be permitted within any township area except in spots well removed from human habitations. It is a question of health versus money and it is for the inhabitants to decide which they prefer.

3 and 4. As regards Indian Quarters and Cow-Sheds there is nothing special to note.

Food and Drink.

5. Preparation and Sale of Food and Drink.—Neither of the bakehouses visited was satisfactory. One was badly ventilated and required lime washing; the other, though better ventilated, also needed to be lime washed and its floor was in bad condition. In one, old bread instead of bran was used as "chapelure" but it was stored in a cupboard and was not full of dust as in a case at Port Louis. The other bakery sells stale bread, contrary I believe to the law, but, as usual, little notice is taken of the misdemeanour. The market was found satisfactory, the meat section being especially good. Indeed all it requires is the protective railing round the butchers' tables to exclude dogs and protect the food exposed for sale. Tripe is sold separately and there is an excellent device whereby it is kept under water. This scheme should be copied elsewhere. A few suggestions were made as regards the sale of fish.

The dust-bin was not of a good pattern* and the market, which is open, adjoins Edward VII Road along which much motor traffic passes raising clouds of dust during dry weather. This road should be treated with tar macadam (*Vide* Appendix I Port Louis Report) or periodically oiled and as far as possible motor traffic along it should be discouraged. Market.

The small Ice Factory passed muster save that the sawdust in which the ice is packed was stored in a heap on the street. This has been discontinued.

6. Slaughter House.—At the time of my visit the slaughter house and its surroundings were clean. There is a filtering screen and absorption pit for sullage and the general arrangements were on the whole satisfactory. I commented on the poor type of knife used by the butchers who kill their own animals. Mr. Pitot, the Secretary of the Board, agreed to have this matter remedied. Slaughter-house.

7. Water Supply.—As at Beau Bassin, so here, the main source is Mare-aux-Vacoas water. Some outlying parts draw their supplies from the Terre Rouge Canal. It would be much better to supply the reservoir water to the whole area and if only waste were checked there would be plenty for everybody. Water Supply.

8. Night Soil Collection, Removal and Disposal.—The remarks made under this heading as regards Beau Bassin apply equally to Rose Hill. The Stanley Company are the contractors and serve the township directly, there being no sub-letting of the contract as sometimes in the case. Five carts and 930 tubs are in use. In many places the latrines are in a scandalous state. In one common lodging house I found that there were only two tubs for 40 people, the removal being thrice weekly. Is it any wonder the soil gets fouled and ankylostomiasis is common, or that flies get every opportunity of spreading the cysts of amœbic and the organisms of bacillary dysentery and of typhoid fever ? The only wonder is that these latter diseases are not more in evidence. The place of disposal is the Ebène Manure Factory. It is a closed Engrais and fairly well managed but, as usual, flies find a happy hunting ground on its precincts. Night-soil Service.

9. Refuse Collection, Removal and Disposal.—The scavenging is not so well done as at Beau Bassin. Otherwise the conditions are much the same and do not call for further comment. Scavenging Service.

10. Railway Station.—This was found to be in a very unsatisfactory state. The women's third class latrine was very dirty and the remarks made on the sanitary arrangement at stations generally (p. 11) apply with special force to Rose Hill Railway Station.

In two tubs behind the refreshment room hundreds of mosquito larvæ were discovered and the water in a drain in this vicinity was found literally crowded with them. Another drain was also noted to have a defective fall. I am glad to say that these matters have been remedied.

It was at this station that my attention was first directed to the practice of watering horse and cow manure intended for railway transport. As a result of this malpractice such manure is rendered more attractive to flies while, when placed in trucks liquid drips on the permanent way and forms pools in which certain species of mosquito breed. The matter formed the subject of my memo (No. 96/R/42 of 25.5.21).

11. Schools.—I visited six schools in Rose Hill and here, as elsewhere, was disappointed to find so many of the buildings quite unsuitable and the sanitary arrangements so frequently deplorable. I am not surprised that Dr. Kendrick in the first, unpublished portion of his report made special reference to the insanitary and dangerous state of school latrines. Schools. School latrines.

The only real chance of educating the general public as regards hygienic questions in Mauritius, is the instruction of the rising generation and what is chiefly wanted is practical teaching. How far this is imparted is shown by the following brief record of school inspections.

(a) *St. Stanislas School.*—Pupils on roll 64. Average attendance 54. Sanitary arrangements disgraceful. Latrine Buildings ruinous and filthy. Only a single tub. One latrine without any receptacle ; its floor covered with excremental deposits. Here, as in nearly every other school, no toilet paper of any kind is furnished those children who are accustomed to use it. The result may be imagined.

(b) *Ecole des Filles de Marie.*—Pupils on roll 182. Average attendance 148. Two latrines with four seats. Very dirty, floors covered with excreta. Here also there was a nuisance caused by a leaking water tap.

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* A new one of an approved design has since been provided.

(c) *St. Enfant Jésus School.*—Pupils on roll 280. Average attendance 248. Here the latrines were clean and Christian children supply their own toilet paper. No lavage water being provided the others employ stones which do not always find their way into the receptacles.

(d) *Mahomedan Aided School*, Inkerman Street.—Pupils on roll 182. Average attendance 131. Latrines exceedingly foul. Two of them without tubs and said to be used all the same by lodgers in the yard. The yard itself was so soiled by excrement that, like Agag of old, it was necessary to walk delicately. Yet in this school the children, for the most part bare-footed youngsters, were taught (save the mark) the principles of hygiene and the dangers of ankylostomiasis were, I was told, impressed upon them. They were certainly more effectually impressed outside the building.

It is only fair to state that Mahomedan latrines attached to a neighbouring mosque were used by some of the pupils and were fairly clean. The washings from the building, however, found their way into a street gutter.

Dirty water from the mosque discharges into the school yard and, all things considered, this school is the worst I have yet seen in the Island.

(e) *Church of England Government Aided School.*—Pupils on roll 162. Average attendance 127. The latrine for girls was clean. That for boys was far from satisfactory.

(f) *Bon Secours Roman Catholic Aided School.*—Pupils on roll 216. Average attendance 161. Latrine building fair but not very clean. There was a water nuisance in the yard.

School hygiene.

This question of schools is a very serious one and calls for prompt remedy. In one school I visited I saw a notice to the effect that no one should read in a bad light and yet the room was so poorly illuminated that I could scarcely decipher the legend though it was printed in large type. The spleen index registers are faithfully kept but at present at any rate the examination is a farce and the record of no value.

I write strongly on this subject because I feel strongly and because it is high time that some action was taken to save the children and to educate them in cleanliness and the principles of health. It is no use having teachers of hygiene who know next to nothing about it. These are merely blind leaders of the blind. It is better not to attempt to teach the subject at all unless it is properly taught and for that purpose the teachers themselves must receive *practical* instruction and, for the children, there must be an abundance of diagrams and pictures and demonstrations. Taught in this fashion hygiene becomes one of the most interesting of subjects. Nothing is more attractive and wonderful than the evolution of the mosquito from egg to imago and there is, unfortunately, abundant teaching material so far as mosquitoes go.

Necessity for educating children properly.

Children would speedily become interested in these matters and familiarity with them, far from breeding contempt would, in many cases, stimulate to sanitary endeavour. It is, however, no use teaching hygiene even in this way if the child sees its canons wholly ignored, both inside the school room and immediately ontside it.

I earnestly trust that this matter of the children will receive the attention it merits, that the schools will be put into a sanitary condition and that sanitation will be taught on sound lines and by the graphic method which alone can be successful. (See also p. 28).

Reformatory and Industrial School.

12. Reformatory and Industrial School.—Both these institutions were found to be in an excellent sanitary condition. In the former a sawdust urinal has been installed and it is acting well. There is a good shower bath. The only fault to be found with the latrines are the spaces between the seats and the tubs which permit some fouling of the bucket chambers. The close supervision exercised minimises this nuisance. In both places the dormitories are well ventilated and the hammock beds of a good type. The boys seen appeared healthy and well fed. The diet scales are ample.

Recreation Ground.

13. Recreation Ground.—The Honourable the Colonial Secretary having rightly laid stress on the importance of providing recreation and playgrounds in all townships, the suggestion was made that the old cemetery at Rose Hill, abandoned 50 years ago and now much overgrown, might be used for this purpose. In many cities, notably in London, old cemeteries are utilised in this way and the open spaces so secured constitute a great boon to the inhabitants and afford a means of combating idleness and its sequelae, alcoholism and crime.

Rivers and Canals.

14.—Rivers and Canals.—The Plaines Wilhems River, Plaines Wilhems Canal and Terre Rouge Canal are common to both Beau Bassin and Rose Hill.

The depletion of the River below the dam in Quatre Bornes has led to a condition favouring the breeding out of mosquitoes. Accordingly the question

has arisen as to the necessity for canalising the river bed. This would be a very expensive operation and I do not think it justifiable. By the simpler methods of training and cleaning it should be possible to prevent anophelines hatching out. It is unfortunate that here there is no chance of flushing the river bed periodically by means of a sluice in the dam. Sluices for flushing purposes.

As already stated the canals which are liable to pollution serve to some extent as sources of water supply. The only way to lessen the resulting risk and danger is to furnish Mare-aux-Vacoas water on a more liberal scale. This is specially required in the case of Beau Bassin.

QUATRE BORNES

This township which covers an area of about 1·90 square miles is not in the direct line between Rose Hill and Curepipe, most of it lying more to the south west away from the Royal Route to Mahebourg at a height of 1,050 feet above sea level. Quatre Bornes.

It is laid out the usual lines but the shop area lies horizontally, not vertically to the hill slope. One of the chief features of Quatre Bornes is the way in which it is smothered in trees. Ross in his report commented on this fact and I should think the condition is even more marked than in his day.

Too many trees shut out light and air and favour the presence of mosquitoes. In moderation, trees are pleasant and useful companions, in excess they are a nuisance and they are a nuisance in Quatre Bornes and should be thinned out. As other special features one may note the raised portion of the Terre Rouge Canal, of which more anon, and the large La Louise drain which was constructed in order to abolish the swamp of that name. Superabundance of trees.

1. Streets.—So far as construction goes there is nothing special to note save the necessity for remedying the lack of fall of certain of the road gutters. It would certainly be an advantage if the drains bordering the main road were rendered in cement concrete. Streets.

2. Yards, Shops and Houses.—There is an exception to every rule. When speaking of common lodging houses in my Report on Port Louis I mentioned the gratifying experience of visiting the premises of an Indian merchant which might be taken almost as a model. Unfortunately I was wrongly informed regarding his name and so erroneously referred to him as Mr. Nalamootoo. I take this opportunity of expressing my regret for the mistake and of stating that he is no other than Mr. A. Allagapan Nainar, President of the " Congregations des Hindous de Maurice." Yards, shops and houses.

So far as shops and yards are concerned his counterpart in Rose Hill was found in Tiam Lun, a Chinese merchant whose premises were a credit to him. Not only were his shop and yard remarkably clean, but the sanitary arrangements were as good as they could be considering that he had to use the customary bad type of latrine tub. He had no knowledge of my impending inspection and his countrymen in Rose Hill, whose properties left very much to be desired, would be well advised to copy Tiam Lun's example.

Generally speaking Quatre Bornes was neither better nor worse than Rose Hill and Beau Bassin.

It was in one of the shop yards of Quatre Bornes that I found numerous stegomyia larvæ in water which had collected on the top of a barrel set on end. Barrels should be stored on their sides to obviate this risk.

3. Indian Camps and Locations.—Of these the most important visited was the Trianon Estate Camp, the first of the sugar estate camps to be inspected. Though laid out on a definite plan the housing accommodation provided cannot be considered satisfactory while the whole area was dirty and untidy. I have had an opportunity of seeing what is being done in Natal in the way of housing coolies on sugar estates, I am familiar through reports with the measures adopted in Sumatra and I have seen many sugar estate camps in the West Indies. The new camps in Natal, the coolie lines in Sumatra and some of those in Trinidad are infinitely superior to the Trianon Estate Camp. It pays to house coolies properly and they will never be really healthy until arrangements are made whereby they all sleep on beds of some kind and not on the floor, and have a sufficient of light and ventilation as well as adequate clothing. Indian Camps and Locations. Necessity for beds.

Experience elsewhere has shown that Indians will readily enough adapt themselves to altered conditions when these are for their good. It is true that a certain amount of education and persuasion may be necessary but they are intelligent people and when they can afford it purchase beds and try themselves to improve their surroundings.

Hammock beds of the type used in the Industrial Schools might be introduced for men's quarters or board beds like those employed in Natal, where one end of the boards rests on a wall ledge and the other is set on lengths of old railway metals fixed upright in the ground and curved to give a supporting surface. The great thing is to get the people off the ground at night for that is the time they are exposed to draughts and acquire colds and influenza. The latrine arrangements at Trianon Estate Camp, while no doubt conforming to Regulation No. 30 of February 25th, 1914, as regards the number of compartments provided, were entirely unsuitable. As a matter of fact the latrines are not much used, or at least not properly used and it is not surprising, considering how badly designed they are to meet the needs of an Indian population. I confess I am astonished to find that, in Mauritius, these needs are so little understood.

Unsuitable latrines.

The latrines in question could scarcely be utilised by children, of whom there are many in the camp and the few persons who do visit them appear to be content with fouling the floor. The latter and the approaches at the time of my visit were filthy and the careful manner in which I had to make my inspection afforded much amusement to the assembled multitude, the majority of whom evidently looked upon the latrines as a huge joke, not on any account to be taken seriously.

I ask again is it any wonder ankylostomiasis is rife and labour scarce and of a poor order? The trials to be made at Metcalfe will, I hope, result in a more satisfactory and yet economical method of dealing with this problem. I am inclined to think that the "fuming pits" mentioned in my Port Louis Report will prove themselves well adapted to Indian needs if facilities for "abdust" (lavage) be provided. (See also p. 33.)

Food and Drink.

4. Preparation and Sale of Food and Drink.—The butchers' shops were fairly clean and the rules in force for the protection of foodstuffs from flies were as a rule found to be observed though here and there panes of glass were missing from the cases in which bread, biscuits, sweets, dried fish and other delicacies were stored. It takes a good inspector to worry people perpetually over such work but it is very necessary to keep vendors of food up to the mark and to remember that a great deal depends on the *minutiae* of hygiene. There is no proper market in Quatre Bornes. Fruit and vegetables are sold in the open, close to the main road and so are liable to get covered with dust. This is not of much importance in the case of vegetables, which are washed before being cooked or eaten, or in that of fruit with thick skins or rinds but it is distinctly undesirable in the case of cut melons, pumpkins and certain other products.

Absence of market building.

In this connection I would comment on the perverse habit in force of cutting the ends of bananas and exposing the pulp to filth and flies. Nature has provided an excellent skin which preserves the fruits in a sanitary condition but for some unknown reason man often lops off the ends. The practice should certainly be discontinued and it should be an offence to expose for sale bananas which have been thus, in some measure, robbed of their protective coats.

Quatre Bornes does not posses a slaughter house and most of its meat comes from Rose Hill. Some, however, I am told is obtained from a private abattoir at Bambous where it does not come under the notice of a veterinary inspector. It is true that a sanitary inspector sees it but he has no special knowledge of meat inspection. The matter requires further investigation and will form the subject of enquiry when the Black River District is inspected.

Water supply.

5. Water Supply.—The main supply is Mare-aux-Vacoas water which as elsewhere, is grievously wasted. Indians and Creoles of course drink from any convenient source and hence have recourse to the Terre Rouge Canal, the La Ferme Canal and other flowing water readily accessible. On the La Louise Estate there are some springs which dry up during part of the year. An extension of the Mare-aux-Vacoas supply is required.

Night soil service.

6. Night Soil, Collection, Removal and Disposal of.—The Stanley Sugar Estates Company Limited are the contractors. Nine men and three carts are employed for the removal of 730 tubs. As usual the contractor is responsible for cleaning the latrines and as usual, and as only to be expected, the work is usually neglected. The same faults were found as elsewhere. The pail contents go to the Ebene Manure Factory. A few private houses possess septic tanks which appear to function well.

Scavenging Service.

7. Refuse, Collection, Removal and Disposal of.—Refuse bins were conspicuous by their absence. The principal spot chosen for depositing sweepings happened to be alongside a butcher's shop. Generally speaking the scavenging appeared to be done not badly considering that 26 miles of

road have to be cleaned! Five carts and 15 men are available for the service. Part of the refuse goes to Ebene Engrais and part is dumped on waste land near Stanley, an undesirable procedure.

8. Railway Station.—There were the usual defects, but at the time of my visit this station was fairly clean. The cover of the urine catch-pit was broken. **Railway Station.**

9.—Schools.—Three of these were inspected, one being a private high class establishment. **Schools.**

(a) *La Louise Government School.*—Number of pupils on roll 224. Average attendance 161. I was informed that the chief causes of absence were illness and poverty. The sanitary arrangements were fair and the latrines were clean. No form of toilet paper was provided.

(b) *Belle Rose Government School.*—Number of pupils on roll 273. Average attendance 160. Latrines fairly clean but latrine buildings in a ruinous condition. Urine catch-pit uncovered. There was a water nuisance in the yard, the standpipe having no tap so that there was a constant waste of Mare-aux-Vacoas water while the absorption pit had ceased to function.

(c) *Loretto Convent Private School.*—Number of pupils on roll 149; Average attendance 120. Sanitary arrangements very good, covered commodes being provided. The only part of the system open to criticism was that carried out by the contractor's men i.e. the emptying out of the commodes into tubs and the cleansing of the former. There is more than a possibility that the soil is fouled in this process but it is carried out a considerable distance away from the school buildings.

The Père Laval Seminary was visited. The sanitary arrangements there are very good.

10. Cemetery.—St. Jean Cemetery was found to be one vast breeding ground for the mosquito, *Stegomyia albopicta*, which lays its eggs in the water contained in the flower vases on the tombs. Attention has been directed to this matter on several occasions. The memorandum relating to the Quatre Bornes Cemetery is attached (Appendix I.). So far nothing has been done. **Cemetery.**

11. Rivers and Canals.—Dams have been built across the Mesnil River and Rivière Sèche to impound water for the "La Ferme" Reservoir. The rivers below the dams being depleted, green algæ have grown abundantly and in the Rivière Sèche the larvæ of *A. costalis* were found even though "millions" were present. The fish were unable to get at the larvæ sheltering in the weed. I have suggested that sluices be fitted in the dams so that the river beds can be periodically flushed. This should lessen the constant labour of keeping the streams free from weeds and larvæ. **Rivers and Canals.**

My attention was directed by Dr. Castel to a serious mosquito nuisance caused by leakage from the raised portion of the Terre Rouge Canal. Anopheline larvæ were found in the seepage pools and in weed-covered expansions of the collecting drain. It will be necessary to repair the canal thoroughly but it was found that the work could not be undertaken till November without the payment of large sums as compensation for cutting off the water supply to canefields. Arrangements were therefore made to place a special "moustiquier" in charge of the area and to have all breeding places abolished and kept under constant control. This has been done with satisfactory results and the canal is to be repaired as soon as possible. **An anopheline nursery.**

I am told that, after it is repaired, it will be broken down by malicious persons who want water for their canes and if such persons are caught *in flagrante delictu* the fine imposed upon them will be so trifling that it will not act as a deterrent. I can only say that persons of this kind who wilfully endanger human health and life and deliberately interfere with sanitary works should be sentenced to a considerable period of imprisonment without the option of a fine. If this were done trouble of this kind would soon come to an end. Magistrates must take a serious view of these offences.

12. Vegetable Garden.—Quatre Bornes is fortunate in possessing a large area of land on the Coriolis Estate where vegetables are grown. Unfortunately mosquito larvæ as well as vegetables were reared there but the irrigation channels and basins are now under the charge of the above-mentioned "moustiquier" and the water stages of *A. costalis* can no longer be found. **Vegetable garden.**

13. Miscellaneous.—Ross in his report speaks of the La Louise Marsh. This has been drained by the large channel which runs through a part of the township. Unfortunately its fall is in places defective and it is fouled by the discharge of surface gutters. **La Louise marsh.**

In a spring at "La Source" the larvæ of *A. costalis* were found. Dr. Castel had the pool cleared and placed "millions" in it.

The small suburb known as Stanley and the Indian village in its vicinity were inspected. The latter reproduced most of the bad features of Metcalfe and requires the same treatment. This village gets its water from the Terre Rouge Canal. If at all possible a standpipe supplying Mare-aux-Vacoas water should be provided.

PHŒNIX

Phœnix.

Phœnix is larger than is generally supposed for much that is commonly called Vacoas is really in the Phœnix area, the boundary between the two townships being the railway line. Thus the so-called Vacoas military area is actually in Phœnix, as are the golf links and other recreation grounds which give it a much more open aspect than the townships hitherto considered. It is also the Headquarters of the British Garrison and contains fine barracks and excellent military quarters.

The sanitation is under the control of the Medical and Health Department but is no better than that of the other townships.

Streets.

1. Streets.—These do not call for any special notice.

Yards, shops and houses.

2. Yards, Shops and Houses.—With one exception the shops and yards presented the familiar aspect of dirt and untidiness, the butcher's shop being especially bad, for there was a litter of bones and refuse all round it and the windows and wire mesh were alike defective.

The exception was the shop of G. Ramsamy which was exceedingly clean and tidy. All food stuffs in it were perfectly protected against flies and ants and the place was a credit to the proprietor. In one yard a latrine was found without a roof. The condition after heavy rain may be imagined while it must not be forgotten that it is in latrines exposed to the sun that most flies are found. All latrines should be covered.

Phœnix camp Trianon estate.

3. Indian Camp.—Phœnix Camp on Trianon Estate was inspected. It presented much the same aspect as the other camp on this estate. In addition to primitive cow sheds there was a row of pig styes which were not productive of nuisance. Neither, at the time of my visit was a stack of cattle manure mixed with some trash. It was dry and not breeding flies. I understand that it is the custom to deposit a certain quantity of human excrement in these stacks. This should not be permitted.

Food and Drink.
Butter Factories.

4. Preparation and Sale of Food and Drink.—Under this heading the only place requiring special mention is a Butter Factory. It is owned by an Indian and while the room in which the butter is made and the utensils employed were found clean and the arrangements fairly satisfactory, the yard and the employees houses were very much the reserve. The people had no latrine at all and used the adjoining cane-field. This factory requires frequent inspection and certain defects in its immediate surroundings should be remedied. There is a second and more primitive establishment in this neighbourhood. It was found in a fairly cleanly condition but it possesses no latrine accommodation. A consideration of butter factories leads to the whole question of milk supply. This is too large a problem to be dealt with here. I would only say that the solution will probably be found in the establishment of milk depots under the control of the Department of Agriculture. (A special note has since been furnished on this question).

Water supply.

5. Water Supply.—Mare-aux-Vacoas water is in general use but many opportunities are presented to Indians and Creoles of drawing water from canals and drains. This is specially true in the Clairfond area (*vide infra*). A service reservoir has just been erected close to the railway station.

Night soil Service.

6. Night Soil, Collection, Disposal and Removal.—The work is in the hands of one government and one private contractor each of whom only employs a single cart. It is not well performed, the customary faults being everywhere in evidence. I discovered that the carters of the government contractor, instead of conveying the pail contents to deep trenches which he was using until his Engrais was built, were throwing them into cane fields. This nuisance and danger was stopped but, with such a system, one is always at the mercy of ignorant and unscrupulous people. The private contractor has an Engrais at Highlands.

At certain populous premises in Clairfond the removal of tubs by the government contractor was carried out only once or twice a month. For this inefficient service a sum of 50 rupees per month was being paid.

7. Refuse,—Collection, Disposal and Removal of.—Scavenging in Phœnix is like scavenging elsewhere save that there is a dumping ground on land belonging to a certain Sowdagur. Scavenging Service.

An old cattle manure factory at Trianon was found in a bad state. The shed was ruinous and the drainage from it passed into a small channel which was urgently in need of repair for pools had formed along its course.

8. Railway Station.—This station was generally in a disgraceful, dirty and neglected condition ; paper and refuse lying all over the place. There was no dust bin of any kind. The latrine building for men was in bad repair, the floor defective, and closet-seats, tubs and urinals in a filthy state. Railway Station.

On the station premises there was a serious water nuisance owing to a leaking pipe. An absorption pit is badly required at the Station Master's quarters.

9. Schools.—*Phœnix Government School* was found to be housed in an unsuitable building which was in a bad state of repair and poorly lighted. The desks were of a faulty type. Number of pupils on roll 138, number present only 59. Absences said to be due chiefly to influenza and measles. Average attendance last year was 101 out of a total of 150. Schools.

There were only 2 latrine seats and the latrines were in a ruinous condition. The seats were quite unsuitable for children and altogether this school created a very unfavourable impression from a sanitary standpoint.

St. Paul R.C. Aided School.—Number of pupils on roll 153. Average attendance 117. Absences stated to be chiefly due to poverty. Apparently not much illness. The buildings were better than usual though the school room was rather dark. The two-seated latrine was in a disgusting condition. In the yard there was a large open refuse pit. The annex for small children presented no special features.

10. Rivers and Canals.—The principal stream is the Rivière Sèche which has been carefully trained and in places canalised. Rivers and Canals.

It is specially interesting in that part of its course where it flows past the golf links for there it is well shaded by Jamrosa trees (*Eugenia jamrosa*). In Ross' time there was much discussion as to whether or not trees shading rivers should be cut down. It was generally believed that anopheline larvæ flourished in water from which sunlight was excluded. This is true of certain species of anopheles but, as Dr. Castel's observations have clearly shown, it is not true of *A. costalis*. The larvæ of this mosquito are not found in shady places, partly because in such spots the green alga on which they feed does not grow. Dr. Castel has demonstrated this fact to me again and again and, in any case, being very familiar with the habits of *A. costalis*, a common African Anopheline, I was aware of its liking for water courses in the full blaze of the sun. I have found its larvæ again and again in pools in the sandbanks left by the falling Nile at Khartoum and elsewhere in other spots where there was not a particle of shade. River Reserves.

At the same time I did not fully appreciate how it avoided shade until Dr. Castel drew my attention to the matter.

Of great interest are the small canals draining the Clairfond area which was formerly a swamp, notorious for malaria and blackwater fever. The change from the days when Ross and Fowler inspected this locality is most marked and those who deny that anything tangible has resulted from anti-malarial operations in Mauritius need only visit Clairfond and study its history to be convinced, unless they prefer to be wilfully blind. Clairfond.

The Plaisance-Trianon Irrigation Canal was found to be overgrown with weeds and in a state most suitable for the breeding out of anophelines. A requisition to have it at once cleared was submitted through Dr. Castel.

11. Military Area.—This need not be described. It is usually regarded as belonging to Vacoas. From a sanitary standpoint it can be commended as an example of a good scheme carefully carried into effect and adequately maintained. The deep absorption pits for surface water function well and show how porous is the subsoil in the locality. Indeed one of the features of a considerable area in Mauritius is the remarkable porosity of the soil, a fortunate circumstance. Military area.

The Military quarters are with few exceptions served by a water carriage system. The great advantages are obvious. The sewage is conveyed to a septic tank near Phœnix Railway Station and after biological action, the overflow passes to a large percolating filter furnished with a self-acting distributor. The effluent from the filter which is clear and has very little smell is used for the irrigation of 7½ acres of cane land and no nuisance results. Water Carriage System.

Thanks to the kindness of the O. C. British Troops and of Mr. Lidstone, R.E., I am able to give certain particulars regarding the installation. Details of system.

The septic tank which can accommodate a 12 hours flow and of which the dimensions are 30′ 9″ × 11′ 6″ × 7′ 9″ was designed to serve 3,000 users. At present there are roughly 2,000. It is divided into two chambers, the capacity of each being 15,000 gallons. At present therefore the provision is 15 gallons per head per diem. The percolating filter which is of the Jones and Attwood pattern, has an area of 9964 superficial feet and the cubic capacity is 994 cubic yards. There is a small detritus chamber. Storm water is dealt with separately.

The cost pre-war was as follows :

Septic tank, filter and distributor	... Rs.	17,160
Distributor alone ...	...	3,150
Total expenditure on drainage scheme ...		147,330

Vacoas.

VACOAS

Part of this place, as already stated is usually confounded with Phœnix. It does not possess many distinctive features. Dotted here and there are good class houses with spacious gardens and the bamboo hedge is an evidence though not so developed as at Curepipe. Vacoas is a very scattered township and possesses a considerable population. (See p. 1)

La Caverne.

The commercial core of Vacoas proper is very limited, but there are a good many shops at La Caverne, a neighbouring village which forms part of Vacoas. Behind Vacoas rises the slope of Trou aux Cerfs and grouped upon it is the tiny settlement now known as Floreal.

Streets.

1. Streets.—The evil results of heavy motor traffic on macadamised roads are perhaps better seen at Vacoas than elsewhere, there being deep parallel ruts in the highway. I should think that in dry, hot weather the dust nuisance must be trying and that systematic oiling or tarring is required.

Yards, shops and houses.

2. Yards, Shops and Houses.—In Vacoas proper a certain Tic-Sin supplies the exception which proves the rule, for his yard and latrine left little to be desired in the way of construction and cleanliness.

The good class private houses visited were found as a rule satisfactory and, in at least one instance, most excellent.

Disgraceful state of Vacoas.

Elsewhere the usual shocks were encountered and it is specially distressing to find such a state of matters in what is practically a new place. Vacoas, for lack of proper care and inspection, is becoming a plague spot. I found filthy yards, faulty gutters, piles of broken bottles, empty tins, bones galore, with dogs gnawing them out in the open behind a butcher's shop, disgusting latrines, deposits of human excrement, small slums in process of formation owing to the sub-letting of premises and indeed well nigh every conceivable form of nuisance. The regulation as regards canes being at least 10 feet from any dwelling house is ignored. There is one Sanitary Inspector and one Sanitary Guard working under a Sanitary Warden but their complete absence would, as far as I can see, make no essential difference.

Food and Drink.

Aerated water factory.

3. Preparation and Sale of Food and Drink.—One need only mention the Aerated Water Factory. Here the plant, originally belonging to the military, is good and the premises are on the whole satisfactory. The syrups are stored in jars and ladled out as required. It would be better if covered metal pans with taps were used. The floor of the factory required repair as did the sump pits outside for they were not working properly. The latrine unfortunately was in a disgusting condition.

There is no proper market in Vacoas, fruit and vegetables being sold in an open space near the railway station.

Water supply.

Spring at La Caverne.

4. Water Supply.—Mare-aux-Vacoas water is generally available. At La Caverne there is an interesting source of supply in the shape of a spring which forms a large pool in the floor of a cavern. It is situated on private premises but many people draw water here. It is now unprotected in any way. The proprietor, Mr. Appavou, generously installed a pump and hose pipe but they were stolen. The water is stated to be good and steps should certainly be taken to protect it from contamination from the hands and feet of those who dip vessels into the pool. It would be a simple matter to close in the accessible part with cement concrete and affix a small hand pump. It would, however, probably be necessary to place someone in charge of the supply to see that the pump was not damaged or parts of it stolen.

Night soil service.

5. Night Soil Collection, Removal and Disposal of.—There is a government contractor employing two carts for 900 tubs and the usual faults are in evidence save in the good class private premises. The Engrais, partly open, is at Bassin, a very long way indeed from the district which it serves.

It is difficult to understand how the work can possibly be accomplished with only two carts. My own strong impression is that much of it is quite neglected. There is certainly no adequate supervision. In one way it is a good thing that the Engrais is so remote for it is a foul and evil smelling spot. Many fly larvæ were seen crawling up one of its walls. Altogether the night soil service at Vacoas struck me as amongst the worst I had encountered which is saying a good deal.

Scavenging service.

6. Refuse, Collection, Removal and Disposal of.—Four carts and 12 men are employed in the scavenging service which is by no means efficient. On the way to the Engrais at Bassin I found a large quantity of town refuse which had been dumped by the wayside. I was informed it had been there for at least 2 months.

Railway Station.

7. Railway Station.- This was found in much the same state as that at Phœnix. It requires to be thoroughly cleaned up in addition to latrine and urinal alterations.

School.

8. School.—*Church of England Aided School.*—Here only the latrines, were seen as the school was closed for the day. The single word "filthy" adequately expresses their condition. With the existing system this must, however, be expected between the time when the closets are last used and that when the tubs are removed. The pity is that after removal the condition usually remains the same as the contractor's men appear never to clean a public or semi-public latrine. I understand they will clean a latrine on private premises if it is made worth their while to do so.

Rivers and Canals.

9. Rivers and Canals.—The River Tatamaka and the River St. Martin have been carefully trained. Drains and canals of any size are little in evidence at Vacoas, the most important being Bonne Terre.

CUREPIPE

Curepipe.

Curepipe may be termed the residential capital of Mauritius. It is 1800 feet above sea level and covers an area of about four square miles. Viewed from the rim of the Trou-aux-Cerfs it looks not unlike one of the small towns in the Scottish Highlands or in the uplands of Surrey. It is however noticeable that much of it lies in a hollow between hills. It is well but not too extensively wooded and its numerous public and private gardens, wide, hedge-bordered streets and lanes, agreeable prospects and beautiful surroundings make it a very attractive spot to the casual observer. Moreover it possesses several fine buildings and churches and many handsome villa residences of the prevailing French type. It is, unfortunately in one sense, fortunately perhaps in another, a very rainy place during part of the winter and its climate is trying especially to those who spend the greater part of the day in the warm coast region and return to its chilly airs and drizzling rain in the late afternoon. At the same time on a fine day its clear crisp atmosphere is delightful and invigorating and it is difficult to believe that it is situated in a tropical Island.

Sanitary defects.

It is not until one undertakes a careful sanitary survey of the town that its deficiencies become apparent and one realizes what an opportunity has been lost of making Curepipe an ideal summer health resort. If in the earlier days attention had only been paid to town-planning and those laws of segregation which are so important in the case of a mixed population, Curepipe might have been made a model town for it possesses many advantages. Generally speaking the situation, despite the fact that much of the town lies in a shallow basin, is good, with fair facilities for drainage though here and there are swampy areas. Some of these have been abolished as witness the locality where the Hotel de Ville and Carnegie Library now stand.

Site.

Indeed so far as reclaiming marsh land is concerned a good deal has been done and much has also been accomplished in the way of laying out pleasure grounds and utilising waste spaces.

Bamboo hedges.

Perhaps the most characteristic feature of the town is to be found in the prevalence of fine bamboo hedges, often of considerable height and thickness. They add greatly to the appearance of the chief residential quarters but are apt to be made receptacles for rubbish though I cannot say that I have noticed this drawback to any great extent. Several rivers have their sources in or near Curepipe and the town is traversed by numerous streams and drains which afford every opportunity for recrimination between the Sanitary Authorities and the Local Board of Commissioners. The latter has for many years had a medical man, Dr. Edwards, C.M.G., as Chairman. He has written much on the subject of sanitation and has frequently pointed out many of the defects to which it is my painful duty also to direct attention.

I note, and it is as well that others should note, that as long ago as 1891 Osbert Chadwick wrote as follows :

Chadwick on Curepipe.

"The area alloted to Curepipe is not yet fully occupied. The evils which invariably arise when a town is allowed to grow up without method, on no definite plan, may yet be avoided. The streams which drain Curepipe are, as yet, not so polluted as to be offensive to eye or nose. But if timely steps be not taken, as the population increases, they will become more and more polluted, so that some of the minor branches at least will be offensive. The severance caused by the irregular courses of natural streams will be found inconvenient. They will then be arched over, sewage will gain access to them, and they will become sewers. Gradually a town will grow up traversed by a system of sewers, of the worst possible description, which will have the construction proper neither for sewage, rain water, nor subsoil water. They will attempt to perform all these functions and fail in all. Such has been in the past, the history of cities, in all parts of the globe ; and such will be the future history of Curepipe, unless timely steps be taken to secure a regular growth, in accordance with the requirements of sanitation. Neglect and apathy has, throughout the universe, produced one and the same result. As the population of cities increases, the health of the inhabitants deteriorates. Epidemics become more and more frequent, at last matters become intolerable. The advocates of reform are at length listened to. Costly works are inaugurated. If these are properly designed and executed, a steady improvement in health is the result. Much more has to be spent to remedy defects, than would have sufficed to prevent their existence. In the meantime there has been great loss of life, and much suffering."

How his prophecy has been fulfilled will be evident from this report.

Sanitary Administration in Curepipe.

The Board has an Architect who is interested in matters hygienic and has studied them to good effect and it possesses two Sanitary Inspectors who have received no special training of any kind. It is responsible for the roads, streets, footpaths, bridges, sewers, canals and other works of public utility as well as for the cleansing and draining of the town, the cleansing, ventilation and drainage of premises, water-closets and privies and generally the night soil service of the town.

What may almost be termed the "Opposition" is represented by the officials of the Medical and Health Department, to wit : one Sanitary Warden one Sanitary Inspector and three Sanitary Guards. The Inspector and Guards are supposed to look after Midlands as well as Curepipe. There is a small rat-trapping gang, the average monthly catch of rats being 500.

It is in Curepipe that the internecine strife is most in evidence and it has wrought infinite harm, preventing necessary action being taken and obscuring the sanitary situation. I need not, however, deal further with this regrettable state of things, but will pass to a consideration of the condition of the township.

Streets.

1. Streets.—For the most part these are wide and well constructed though they are beginning to suffer from heavy motor traffic. Here, as elsewhere, it will be necessary to ensure that main roads have good foundations and are properly drained. A place full of influential residents like Curepipe should certainly be in a position to have all its main road-side drains properly lined with cement concrete. It is true that if earthen drains are carefully cleaned and upkept they may not be productive of much nuisance, even if they receive foul surface washings. They are not properly scavenged in Curepipe and, even when they are cleaned, the scrapings from them are too often thrown out on the road to dry in the sun and become offensive. Many of them receive washings from latrines, kitchen sullage, the drainage of cow sheds and so forth and hence it is very desirable that in a town with the pretensions of Curepipe they should be properly constructed. Where a satisfactory fall cannot be obtained benefit is likely to accrue from placing automatic flushing tanks of the "Field" pattern at the head of the drains. These might with advantage be installed in the case of some of the existing gutters which are too broad and shallow and are laid too much on the level. To the onlooker it is curious that the inhabitants of an attractive town like Curepipe do not take a greater interest in its amenities and that they appear unwilling to find the funds necessary for its proper maintenance. There is a clamour for government assistance but it is an old and true saying that "God helps those who help themselves." Curepipe certainly merits care and solicitude from its wealthy residents.

"Field" flushing tanks.

Yards, shops and houses.

2. Yards, Shops and Houses.—While the shops often present a better appearance within than without, most of the yards were found to be in a highly insanitary condition. All the faults present in the other townships

were in evidence in Curepipe ; badly paved premises, dirty and ruinous latrines, leaking water taps, potential mosquito-breeding places of various kinds, blocked absorption pits, stray fowls, ducks, dogs and other animals, collections of refuse, defective and foul drains, neglect of regulations for the prevention of rats and as regards sleeping rooms, dirty kitchens and indeed almost every conceivable form of nuisance. There was scarcely a single yard to which objection could not be taken on one ground or another. That this need not be the case has been recently forcibly impressed upon me by what I have found in Mahebourg where, on the whole, the condition of the yards is very creditable and where in some cases they are excellent.

Superiority of Mahebourg.

It is indeed strange that Mahebourg should be so far in advance of Curepipe in this respect and it shows what can be done by an energetic inspector in the absence of dual control and by a community which makes a serious effort to live in cleanly surroundings. It is necessary to comment upon the totally inadequate arrangements for bottle-washing in the case of chemists and grocers' shops in Curepipe.

I have already mentioned the four small slums areas which disfigure the residential capital. They are known as Camps Munsy, Dowjee, Malartic and Mungoo and are a disgrace to the town. The housing conditions in these places are very bad and the sanitary arrangements are shocking. Camp Munsy extends from Remono Street, Curepipe Road along the main road towards Pope Hennessy Street, and surrounds Lionet's stores. Camp Dowjee is on the northern side of Malartic Street and reaches the main road to Mr. Palma's property. Camp Malartic lies on the southern side of Malartic Street and stretches from the main road to the railway. Within the area are included a mosque and Mr. J. Cowar's property. Camp Mungoo is behind the Sanitary Office, Curepipe Road and extends from Nayna's property to the railway line. Mr. Marion, Architect of the Board of Commissioners has kindly furnished me with a map of these slums areas and has given me the following information regarding them.

Slum areas of Curepipe.

Camp		Acreage		Registered Value
Munsy	...	1 A. 29	...	Rs. 97.700
Dowjee	...	0 A. 76¼	...	60.700
Malartic	...	1 A. 34	...	71.800
Mungoo	...	0 A. 65½	...	12.100
TOTAL	...	4 A. 04¾	...	Rs. 242.300

No less than 28 different landlords share the onus of housing human beings in these dilapidated and dirty camps. They are hidden away behind the main street. Presumably most of the well-to-do residents in Curepipe are not aware of their existence but it is here that flies are bred and that infection may arise. They should certainly be abolished (see Recommendations p. 36).

But insanitary conditions are by no means confined to the shops and slum areas. In many of the private premises nuisances abound. Pass to the rear of an attractive house and garden and the servants' quarters will too often be found disreputable and dirty while the latrine is not uncommonly defective in some respect. It is true that this is not invariably the case. Some of the quarters visited were found quite satisfactory save for the unsuitability of the latrine receptacle which is not the fault of the owner or occupier.

Private premises.

In some cases the closet is inside the house and when this is the case it appears to be kept in a cleanly state. Water nuisances are common. In one garden the hollow stems of broken bamboos were full of water breeding out *Stegomyia albopicta*, in another there was a leaking tap, in yet another a faulty drain, while sullage from kitchen sinks was sometimes found discharging in the open.

Bamboos as mosquito nurseries.

Occasionally refuse pits were discovered and in one instance the drain from a cow stable ended in the rubbish pit. These are a few examples of what should not be permitted and what would not occur if householders took a little trouble and realized their responsibilities.

3. PREPARATION AND SALE OF FOOD AND DRINK.— Of the bake-houses inspected the only one meriting a word of commendation is that owned by the Modern Bakery Co. Ltd. Here I saw for the first time in Mauritius a machine mixer. The oven was of a modern type, there was a good flour store, bran was used as " chapelure," the place was clean and, though the floor was not of the best type and there were some minor deficiencies, this bakery was on the whole satisfactory.

Food and Drink.

Good bake house.

Neither of the *Aerated Water Factories* visited was up to the mark. Both will have to conform to the regulations which it is hoped will shortly be issued.

Aerated water factories.

Market.

Curepipe possesses a very fine and commodious covered *Market* which cost a great deal of money to erect and which, on the whole, is a credit to the town. It is well designed, there being a section for the sale of tripe. Railings are required to shut in the butchers' stalls and to exclude dogs. Dogs indeed should not be permitted in the market at all. The latter appears to be well looked after and there are good cleansing facilities but some of the windows require repair and the hucksters' stalls are not kept in a very sanitary state. The market latrine was found in a bad condition while a yard behind the building was littered with bones said to be carried there by dogs. The drain receiving waste waters from the market is very dirty and Dr Edwards complained to me about the practice of loading railway trucks with manure close to the market. It appears that remonstrances have been repeatedly made on this matter without effect. The practice should certainly be discontinued.

Slaughter house.

The *Slaughter-house* is privately owned and is little better than a shed with a few appliances for butchers' work. At the time of my visit it was found to be in an unsatisfactory state and the cruel practice of permitting animals to see their fellows slaughtered was, quite unnecessarily, in vogue. Intestinal contents were dumped on the ground in the vicinity of the booth while the blood was run into two open pits and an old well at no great distance. These receptacles emitted a disgusting odour. The only thing to be said in favour of this unsuitable and rudimentary form of slaughter-house is that it is far away from any human habitation.

The Board intends to erect a new slaughter-house of modern type and I visited the proposed site which appears suitable enough, though it is rather far from the market. Cattle on their way to slaughter should not be driven through the town. They foul the streets and introduce flies.

Water supply.

4. Water Supply.—Curepipe which possesses two service reservoirs is fortunate in being, to large extent, supplied with Mare-aux-Vacoas water. As usual there is a great deal of waste and carelessness in its use. I found that there existed about 150 shallow wells. My attention was first directed to these wells when visiting a "typhoid fever" area in the Anderson Street district. There, in La Croix Street, I found a room 12' × 12' × 12' which had been occupied by 2 adults and 6 children. Five cases of typhoid fever had occurred *simultaneously*, an important point, in this family. One patient had died, one child was still ill at the time of my visit. In adjoining premises there was a dhobie. The water supply was derived from a shallow well in proximity to the house. This well had a masonry coping and a cement cover in which there was an opening. Water was drawn by a pail lowered by a rope. I watched the process and noted how the splashings from the pail, after being fouled by the drawer's bare feet, found their way back into the well. I was also informed that any convenient receptacle was used for drawing the water. It was clear that there was here every opportunity for pollution of the well.

Shallow wells.

An enquiry was instituted and other wells were inspected in various parts of the town. I was informed that in most parts of Curepipe the subsoil is very porous. Cracks and fissures abound in it. The water in one well had been proved to be contaminated by drainage from a cemetery. It was common knowledge that cases of typhoid fever and dysentery occurred in districts served by some of these shallow wells. Efforts had been made to get them closed but, so far, in vain. I requested the Sanitary Inspector to prepare a map showing the position of the wells and indicating their association with cases of the two diseases mentioned. He did so and the map forms a remarkable and suggestive record. It cannot now be reproduced but I hope to include it in my full report to the Secretary of State for the Colonies. It shows clearly no less than 12 groups of wells associated with cases of dysentery, apart from individual wells similarly incriminated while in 4 groups a connection with typhoid can be traced and there are 2 instances of typhoid cases associated with single wells. As a result I submitted memorandum No. 136/R/50 of 20th June recommending that all the shallow wells in Curepipe be either filled up and closed with cement. There is no need for them and they are undoubtedly in many instances a danger to the community. Their abolition will involve little hardship. In most cases there is a public fountain at no great distance supplying pure Mare-aux-Vacoas water. Where the fountain is out of order it must be repaired. Where it is too far away a new standpipe must be erected and, if necessary, additional water pipes must be laid. As is always the case certain well owners will object to having pure water laid on their premises because they have to pay for it. Such individuals deserve no consideration. Personal grievances of this nature cannot be allowed to stand in the way of an important hygienic

Association of wells with cases of typhoid fever and dysentery.

measure. The wells are to be closed and there can be no doubt that, as a result, the incidence of typhoid fever and dysentery will notably diminish. In a place like Curepipe shallow wells are always apt to be a danger and it must be remembered that every case of typhoid fever and dysentery occuring constitutes a fresh focus of infection and that the causative organisms are not spread merely by water and watered milk but by flies, the hands of persons engaged in preparing and handling food and possibly, in some instances, by dust.

Necessity for closing wells.

Foci of infection.

5. Night Soil, Collection, Removal and Disposal of.—The Stanley Sugar Estates Cy. Ltd. are the Contractors. They employ 9 carts and 30 men for the daily and tri-weekly removal of 1,946 tubs. The usual faults are present in a marked degree. It is strange to find that a town of the size and importance of Curepipe possesses no public latrine or public urinals. Considering the state in which these conveniences are invariably found elsewhere, and the condition of the latrines at the Curepipe Railway Stations which largely function as public closets, it is perhaps as well that they do not exist. At the same time such an omission marks a very poor conception of the sanitary needs of a large town. Another method to which it is necessary to refer is a method common amongst the better classes in Curepipe many of whom employ commodes as is often the custom in India. To this there is no great objection provided due care is exercised. Unfortunately the contents of these receptacles are emptied into the latrine tubs in the immediate vicinity of the house and the receptacles themselves are cleaned on the spot often with an implement resembling a mop. In this way soil contamination may occur.

Night soil service.

The Engrais presented a remarkable appearance. The greater part of the yard was covered by a huge heap of town refuse. Part of this was stacked up to twice the height of an ordinary night-soil cart. One corner emitted a disgusting odour. There was a large metal receptacle in the yard which was said to be used for washing tubs. If so, they are washed in liquid excrement. The stench from this vessel was sickening. The engrais buildings are of the closed type and are well constructed but even so nuisance cannot be avoided. Outside one of them I found a large number of the larvæ of the blue-bottle fly crawling on the pavement while on the adjoining cane leaves thousands of sated flies were congregated. It was amusing, if sad, to be told on a second visit to this delectable spot that the flies had all been abolished by the simple process of cutting off the leaves on which they had been resting !

Curepipe engrais.

The camp of the unfortunate persons engaged in the work was of poor construction and in a filthy state. I was told that cases of dysentery were common. Two men were suffering from it at the time of my visit. The stools from dysentery cases are, without disinfection, thrown into the engrais. Save in the matter of buildings this establishment almost vies with the Roche Bois Factory at Port Louis as one of the most intolerable nuisances in Mauritius.

Camp attached to engrais.

This is no exaggeration. In no other British Colony with which I am familiar, and I have visited many, would such places be tolerated, even though in some of these Colonies sanitation, I regret to say, leaves much to be desired.

The system itself is a bad one but the way in which it is conducted is much worse and those who manage these factories appear in some cases to have no sense of their responsibilities, even when every allowance is made for the difficulty of obtaining labour. The Press has rightly again and again drawn attention to this scandal, for it is nothing else, but, as far as I ~~am~~ ascertain, consideration for vested interests or the difficulties of applying pressure to those who hold what are practically monopolies has effectually prevented anything being done.

And yet certain regulations are actually in force, based on suggestions I made when consulted some years ago by the Colonial Office, which would undoubtedly mitigate the nuisance to some extent. The measures advocated are simple and inexpensive but it appears that the very idea of spending more money in making these engrais less dangerous and disgusting raises a storm of threats and protests. Do those concerned ever think that there is such a crime as potential homicide ? I understand however, that there is another side to the question for it appears that until the engrais at Curepipe was established at considerable cost the custom obtained in many places of merely throwing out night soil on the surface of the ground anywhere, and frequently in the vicinity of dwelling houses.

One must admit that the engrais, with all its shortcomings, is an improvement on such a medieval and dangerous practice but the fact remains that the working of the system is left to ignorant and careless people and the public welfare is ignored.

Private septic tanks.

In Curepipe the system of private septic tanks has been developed to some extent. I have studied the plans of the local types of installation. They do not in all cases conform to modern requirements and it is possible that there may be trouble in connection with some of them. Still, so long as the main principles governing biological treatment of sewage under anærobic conditions are not violated, most forms of septic tank operate well, at least for considerable periods but the effluents require to be watched. The form in use at the Curepipe Club is quite new to me. It appears to be more of a closed fosse than a true septic tank. It was noted that its man-hole cover was defective.

Scavenging Service.

6. Refuse, Collection, Disposal and Removal of.—There are neither public nor private dust bins and accordingly the usual nuisances exist. I suppose persons become so inured to the sight of streets, pavements and gutters littered with garbage and rubbish that they fail to notice a state of matters which at once surprises a visitor accustomed to well-scavenged towns and which is anathema to the hygienist. Refuse disposal and removal is no more work for a contractor than is a night-soil service. Both can only be properly carried out by some authority taking a real interest in the matter and a pride in seeing that the duty is efficiently performed. A radical change must be made. I have already commented on the disposal of the refuse. Apart from the question of smell and flies and the risk of infection it must not be forgotten that piles of garbage attract rats and afford them sustenance. The proper way to deal with the refuse of a town like Curepipe is to burn it. At present the Contractors employ 16 carts and 60 men including sweepers.

Railway Stations Curepipe.

7. Railway Station.—There are three in Curepipe, the Central Station, Curepipe Road and Forest Side. The Central or Curepipe Station at the time of my visit was in a disgraceful sanitary state.* The women's latrines for first and third class passengers were found to consist of water-closets which drained into pits in the floor from which the sewage is baled out. The men's latrine was in a shocking state. The sewage is run into a pit in an adjoining carriage shed whence it is also baled out into the tubs of the night soil carts. This shed was littered with soiled paper and altogether the condition was indescribably filthy and abominable. A refuse heap was found in the station enclosure. A tunnel passes below the permanent way. It is badly lighted and used as a public convenience.

Curepipe Road

Curepipe Road station was a degree better but the men's latrine was very foul. Sawdust was used in the urinals but the quantity was small and as it had not been changed for a long time it had become very offensive. The drainage from a latrine floor was fouling the street wall of the station and passing into an open gutter.

Forest Side.

Forest Side station is small. There was some rubbish lying about it and the latrine was filthy.

The Railway Camp at Curepipe station, which consists of two sections requires special mention. It might with justice be included amongst the slum areas. In the larger section the so-called houses in one long range suggest dark and dismal caves rather than human habitations for, in most cases, the latter are one-roomed houses, practically back-to-back, though it is true the partition does not reach the roof, and void of windows and any kind of through ventilation. At the time of the last plague outbreak the roof was altered. It is high and has ridge ventilation but ventilation openings at such a height can do little good and these lines are, in my opinion, unfit to be used for dwelling places.

In the smaller section the houses are a degree better though they are mean and unsuitable habitation for government labourers.

The yards in both sections were littered with garbage. In the smaller section there was a single latrine tub for about 50 people, in the larger, though the number of receptacles was sufficient to serve 40 persons, the latrines were ruinous, unsuitable and foul.

Schools.

8. Schools.—In addition to the Royal College five schools were visited.

(a) The Rector of the Royal College had, prior to my inspection, informed me that, in his opinion, certain defects in sanitation required to be remedied. As a result of my visit I found myself in agreement with him though the defects were not very serious. I have recommended certain alterations in the urinals and latrines and a slight modification of the sanitary arrangements at the new gymnasium. The premises generally were found in a cleanly condition and deodorants are employed.

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* I am glad to say that this has now been improved.

(b) *Brown Sequard Government School.*—Number of pupils on roll 451, number actually present 267. In summer the average number present is 350. Absences said to be due to fever, influenza and poverty. The school building is of a poor type and the accomodation inadequate. There were sawdust urinals of an unsuitable pattern and the urine catch-pit was uncovered. The latrine buildings were in a ruinous condition. They contained only 3 tubs which are removed daily. The attendant's quarter was bad, being little more than a corrugated iron shed.

(c) *Cossigny Street, Government School.*—Number of pupils on roll 232. Number actually present 147. Average 153. Causes of absence same as above. Six-seated latrine with a good floor but bad seats.

(d) *R. C. Aided School.*—Number of pupils on roll 409. Number actually present 236. Average attendance 251. Chief cause of absences stated to be poverty. Eight seated latrine. No toilet paper of any kind.

(e) *Loretto Convent School.*—This is a better class school evidently well managed from a sanitary point of view. Number of pupils on roll 330. Average Attendance 275. A special cloak room is provided for the children and a septic tank is in course of construction. The sanitary arrangements were on the same lines as those in the school of the same name at Quatre Bornes.

(f) *Christian Brothers School.*—Number of pupils on roll 260. Average attendance 230. There are 40 boarders ; their quarters were found clean and commodious with fair facilities for washing and for baths. Although the building is of wood I was informed that bed-bugs and fleas are conspicuous by their absence. There are 6 urinals and the latrines have 12 receptacles. A very good system is in force whereby each class has its own compartment, the key of which is kept by the master. Unfortunately the removal is only tri-weekly. A daily service is essential. Refuse is dumped in the garden and used as manure. The system is faulty and as a result, a good many flies were found in the refectory. Information was furnished as to how to deal with refuse and amendment promised. On the whole the conditions in this school were quite good.

Cemetery.

9. Cemetery.—It is surprising to find that there is now no cemetery in Curepipe. Since the old cemetery was closed burial takes place at Quatre Bornes or Beau Bassin. Apart from the trouble and expense which such arrangement must entail it is probable that in the case of the poorer Creole population the long journey on foot to St. Jean Cemetery or Beau Bassin and back in wet and inclement weather is a cause of invalidating and possibly of further visits to that place of interment. A new cemetery should undoubtedly be provided at Curepipe. I have visited, at the request of Dr. Edwards, C.M.G., a site where it is proposed to lay out a burial ground. There is no fault to be found with it from a hygienic stand-point and the question of utilising it or re-opening the old burial ground is really a financial one. A short memorandum has been furnished on the subject.

Rivers and Swamps.

10. Rivers and Swamps.—Numerous rivulets course through the township and some of them have their origin in springs within the town limits. During their course through Curepipe most of them become polluted owing to clothes being washed in them and from the addition of foul surface drainage. It is distressing to see clear hill streams spoilt in this way. Field laundries are required (see Recommendations p. 36).

The feeder of the Mesnil River which has a poor fall is heavily contaminated and I am told becomes very foul in the dry weather. It requires to be cleaned out and deepened.

There are still a few swamps in Curepipe though much has been done in the way of draining and filling up marshy areas. The two most important are the Mare Barry and the Mare Diore. Neither is extensive nor is there much danger from them as *A. costalis* is rarely found in Curepipe. They could easily enough be drained. If the river Mesnil were deepened it would be possible, by means of open cuts or agricultural field drains, to render dry a considerable area of what is now waste land which cannot be utilised in its present condition.

Military Camp.

11. Military Camp.—Save for the buildings leased to civilians this is now tenantless. It contains excellent quarters and considerable hospital accommodation of a high class. It is served by a water-carriage system and possesses its own septic tank and percolating filter of the ~~Stafford~~ Stoddart type. There is an elaborate system of surface drainage and indeed this area on which large sums must have been spent reproduces the satisfactory conditions present in the Vacoas Military area.

Curepipe possesses no hospital of any kind, a point to which attention will be directed in another report. Hence the proximity of the abandoned military hospital merits consideration.

In describing the sanitary condition of these townships, I have, purposely, entered much more into detail than was the case in the report on Port Louis. By doing so it is hoped to bring home to those who actually live in these places and many of whom are influential members of the Mauritian community, the great and pressing need for sanitary reform. Emerson's dictum may always be quoted with advantage. "The first Wealth is Health." Health can only be obtained and preserved by obeying the laws of hygiene which are now as well known for tropical countries like Mauritius as they are for temperate lands.

The first Wealth is Health.

Something must be sacrificed to gain sanitary efficiency; some leisure, some money, possibly some peace of mind but if only public opinion can be aroused a great deal can be accomplished in a short space of time.

Much can also be done if the lower orders of society can be made to understand what hygiene means, not perhaps so much to themselves as to their children. It is as a rule little use dragooning them. I have been sorry to hear the way in which some of the Sanitary Inspectors speak to those whose teachers they should be. Save in the case of mosquito breeding nuisances when after one warning stringent action must be taken it is far better, in the first instance at least, to try persuasion than force and if a little humour creeps into the persuasion so much the better. Sanitary work has perhaps more humour in it than it is generally supposed and instruction can often be imparted in a manner which disarms criticism and checks opposition. A sympathetic and intelligent administration will seek to excite interest and stimulate endeavour by the distribution of informative pamphlets and diagrams specially adapted to local conditions, by lantern lectures, by demonstrations, by the use of models and by promptly driving home the lessons taught by epidemics and bereavements. It is true that in the case of certain individuals all such appeals will fall on deaf ears. Either they have not the sense to understand or they are scoffers or they are selfish and care nothing about the poorer brethren or they reverse Emerson's motto and place their money bags before their health and well-being, or they are merely slack-fibred and, like Gallio, care for none of these things.

Necessity for instruction.

It is for persons of this stamp that the resources of the law are required but there would be far fewer of them if the children were properly trained at school. At present their course in hygiene often starts with dry facts about human anatomy and physiology though I understand an improvement has been recently effected in this particular. Much of what they learn is beyond them and they acquire a dislike to the whole subject. When they do reach the sections which might interest them they have to learn facts by rote, facts which they can repeat in a parrot-like fashion but without any real uuderstanding. The whole thing is a waste of time. Indeed it is worse, for it engenders a distate for anything bearing the name of hygiene.

School education in hygiene.

No one should be asked to teach the latter who does not appreciate its true meaning and who has not been trained to use his or her powers of observation in the daily things of life. No child should be forced to learn the subject unless the teacher is supplied with pictures and diagram many of which can be made exceedingly attractive and is prepared to supplement the mere book work by lessons in the field and by the display of specimens, as for example mosquito larvæ and pupæ various species of noxious insects, samples of food stuffs, small cheap models of sanitary contrivances and so forth. In every school indeed there should be a little sanitary demonstration centre like those so effectively employed during the war and the proper preparation and cooking of food should be taught.

The Teachers. Sanitary Demonstration Centres.

A distinguished officer of the Indian Medical Service has written an admirable sanitary primer for school children. It is in the form of a series of stories and has been found most useful.

No one who has read the tale of how plague was stamped out in the town of a certain Rajah will ever forget the association of rats and human plague. It is a kind of fairy tale but running through it is the golden thread of truth.

Indian primer.

It is a pleasure to find that the Honourable the Colonial Secretary was acquainted with this work and had taken steps to get copies introduced into the schools here.

It is attractively illustrated and though it deals with Indian conditions, it will serve the purpose until some one writes a similar book expressly for Mauritius. It is true that Dr. Crétin's book deals with Mauritian conditions but it is neither complete nor up to date and is in the form of a cathechism which is undesirable. Education then will help but it is the hope of the future. Hope for the present lies more in establishing a proper sanitary

Need for special Mauritian primer.

administration and carrying out such works as may be necessary to safeguard the public health. To these important matters I would now direct attention, after stating that during my inspections I was accompanied by the Sanitary Warden and by Sanitary inspectors and that as far as possible, action has been or is to be taken to abolish the more serious nuisances which came under notice.

Sanitary Administration

Sanitary Administration.

I am strongly of opinion that for purposes of administration the whole of the six townships should be united to form one sanitary district. This will then become a single urban area secondary in importance only to Port Louis. I would recommend that an experienced Medical Officer of Health be obtained and placed in charge of this area. He would replace the Sanitary Warden and should receive a salary of at least £800 per annum. I very much doubt if a competent man of the type required and with the necessary driving power can be secured for less than £1,000 per annum. He should be given two qualified Sanitary Inspectors thoroughly versed in sanitary science and with a good knowledge of building and plumber work who, if possible, have had practical experience of anti-mosquito operations and are familiar with the tropics. The salary paid to each should be £400 per annum.(Rs. 6,000)

Medical Officer of Health.

Qualified Sanitary Inspectors.

I would prefer to see more than two, for the area is a large one and if the necessary registers are to be properly kept the office work will be heavy but I realize that there should be as many posts as possible for such of the local sanitary inspectors as have shown themselves capable and energetic.

At least two of these should also be attached to the Medical Officer of Health. Sanitary guards, functioning as sub-inspectors and undergoing special training would also be required together with rat catching gangs and the other personnel already in existence.

Local Inspectors.

A question which must be settled is the authority to whom the Medical Officer of Health and his assistants will be directly responsible.

It is clear that the dual control which at present exists in some of these townships must cease. I am no enemy to local self-government. I recognise that, in the natural process of development it is only right that the people of a town or district should manage their own affairs. This is the way of all progress and the conferring of responsibility usually arouses interest and stimulates to exertion.

Abolition of dual control.

Hence under ordinary conditions one would be inclined to place the area under a Municipality and let the health officers serve that body. The conditions, however, in relation to these six townships are by no means ordinary. In the first place it would take a considerable time before they could be welded together to form a corporation capable of exercising jurisdiction and control. In the second place sanitation has fallen into such a state that unless its administration is placed wholly in expert hands it is hopeless to expect a change for the better. I would therefore urge that the Medical Officer of Health be placed directly under the new Director of the Medical and Health Department and be responsible to him, under Government, for the sanitary condition of the area, the word sanitary being used in a sense presently to be discussed. It will be seen that the proposition is practically identical with that advocated for Port Louis save that fewer qualified Sanitary Inspectors are required. At the same time it must not be forgotten that the rate of pay of local sanitary inspectors is undoubtedly much too low. ~~I am of opinion that~~ In the case of all those whose services are worth retaining the yearly salary should not be less than £150 (Rs. 2,250.) Furthermore there should be a sliding scale and it should be possible for any of these men to reach a maximum of £250. (Rs. 3,750.)

Pay of Local Sanitary Inspectors inadequate.

In no case, however, should any increase above £150 be granted until an inspector has undergone a course of special training and has passed an examination adapted to show his proficiency in hygiene as applied to Mauritius.

Examination in hygiene.

In my 47/R/17 of 26th April I indicated how the instruction would be given so far as Port Louis is concerned. In the Beau Bassin and Curepipe area I would suggest that the Medical Officer of Health himself should undertake the teaching, assisted, so far as practical demonstration is concerned, by one of the new inspectors. The examining Board should, I think, consist of the Director and Deputy Director, Medical and Health Department, the Special Malaria Officer, who I submit will have to be appointed for the whole Island apart from the two large urban areas, and some other professional man possessing a degree or diploma in sanitary science. I am also of opinion that if, in the process of time, the posts held by the new, qualified sanitary inspectors become vacant

Examining Board.

Higher promotion for local sanitary inspectors.

local inspectors should be eligible for them provided either that they have gained the certificate of the Royal Sanitary Institute or the Sanitary Association of Scotland or, by a course of extra study, have qualified to sit for and have passed a special advanced examination to be held in Mauritius.

Indians as sanitary inspectors.

It would be a good thing if some of the well educated members of the Indian community found their way into the sanitary service. In India many Indians have devoted themselves to sanitary work and have written manuals of considerable merit. They would understand Indian conditions, could be most usefully employed in several directions and would be able to influence Indian opinion and spread the Gospel of hygiene amongst their countrymen in a way which cannot be done by others.

Duties of Medical Officer of Health.

Reverting now to the duties which would fall to the share of the Medical Officer of Health I would place him in charge of all the conservancy and scavenging work, including the cleaning of drains and gutters. He would be responsible for anti-mosquito and anti-malarial works within his district save such as require to be carried out by the Department of Public Works. He and his assistants would conduct all sanitary inspections, deal with cases of communicable disease, organise a campaign against vermin of all kinds and arrange for disinfection. He would undertake systematic school inspections and pass the plans of houses and other premises submitted to him for sanitary approval, a most important part of his duties. He would, through his Chief, advise the various local Boards on any matters connected with public health coming under their cognisance and he would be in charge of any infectious diseases hospitals which may be established in his district. He would not be responsible for the Mare-aux-Vacoas water supply but would take action as regards leaking taps, fountains, pipes and mains and with reference to other sources of water supply. He would compile the health statistics of his district and issue an annual report upon its sanitary condition. He would be in charge of any anti-tuberculosis scheme which may be adopted and have control of measures devised for infant welfare and for the improvement of Indian villages in his area.

In fact he would carry out all the varied and onerous duties which now fall to the share of a Medical Officer of Health in a populous district. The markets, slaughter-houses, cemeteries, *upkeep* of roads, streets, footpaths, drains, gutters, canals and streams would remain in the hands of the local Boards, together with structural work in connection with premises and buildings. This would leave in the hands of the Boards all sources of revenue but the Medical Officer of Health would, of course, have powers of inspection and, after due notification, would himself carry out or have carried out such necessary works as the Boards refused to perform and yet which were manifestly their duty. In this way, I trust, that a much more active and effective administration will be obtained. The Medical Officer of Health should also deliver lectures in his district and circulate information of general interest on public health matters, endeavouring by every means in his power to carry all classes of the population with him in such reforms as it may be necessary to inaugurate. Everything depends on the type of man secured, hence the necessity for the introduction of fresh blood and new ideas.

Delimitation of functions of local Board.

Necessity for lectures and circulation of information.

Sanitary Works

Sanitary Works.

It must, I think, be evident from a perusal of this report that the principal source of nuisance and one of the chief causes of disease in the Beau Bassin–Curepipe area is the system of conservancy in vogue and the utterly inefficient way in which it is everywhere conducted save in places where septic tank installations exist. Hence the most important measure to be undertaken is undoubtedly the provision of a water-carriage system. I have given this matter long and earnest attention and have studied various reports and documents dealing with the question.

Water-Carriage System.

Note by Chadwick.

It formed the subject of a short note by Chadwick in 1891 wherein he says :

" In the case of inland towns application to the land is the most complete and economical method of sewage treatment. I have spoken on this subject to several planters ; and they assure me that there will be no difficulty in disposing of the sewage, all the year round, either on canes, or on the crops which are used in rotation with them. As these recommendations are made on the supposition that rivers are no longer to be used as sources of domestic water-supply, the sewage might be admitted to the river, after chemical treatment to remove its offensive smell and appearance.

In the event of any difficulty as to the disposal of sewage by irrigation, a better plan than purification would be to construct an outfall to the sea.

In the case of Curepipe the same out-fall sewer might serve for Curepipe, Vacoas, Phœnix, Quatre Bornes, Rose Hill and Beau Bassin. The cost, when distributed, would not be excessive. It would be quite practicable to arrange the out-fall sewer, so that the sewage might be diverted from it for irrigation, whilst in the wet season, when not wanted, it should be thrown into the sea."

This was written at a time when the biological treatment of sewage was unknown and we now have means of dealing with sewage in various ways which did not then exist.

Discharge into sea not advocated.

As a result, I think the idea of constructing an out-fall sewer to the sea, a sewer serving all the six townships need not be seriously considered. The cost, for one thing, would I believe be heavy considering that there would be very little return for the outlay, so far as disposal goes, and perfectly satisfactory arrangements can be made for dealing with effluents by irrigation provided, of course, there is adequate inspection and control. (See also alternative method of disposal p. 34.) At the same time the question is largely one to be settled by the Consulting Sanitary Engineer.

Bio-æration of sewage.

The most recent of all developments is what is known as Bio-æration or the use of activated sludge in open tanks into which compressed air is driven. The pendulum has swung the other way and instead of an anærobic treatment the ærobic method now holds the field, though one must remember that it is still upon its trial. Prior to leaving England I visited Sheffield where the latest modification of the bio-æration system has been introduced by Haworth. Noticing how a river undergoes purification in nature Haworth considered it probable that there was no need to make use of compressed air, in other words that sewage could obtain all the oxygen required for the biological process from the atmosphere. Hence he treats sewage in specially constructed tanks where, after the biological treatment is started with activated sludge, air is supplied by means of surface paddles and is also absorbed by the flowing stream of sewage.

The Haworth process.

There can be no doubt that his method avoids some of the difficulties met with in the compressed air method and yields an excellent and non-putrescible effluent of considerable manurial value.

Bio-æration system not suited to Mauritius.

Unfortunately I do not consider this method of disposal suitable for Mauritius. It necessitates machinery and machinery necessitates skilled supervision and is apt to get out of order. Moreover, in a climate like that of the Beau Bassin-Curepipe area, I cannot be certain that Haworth's method would not create a nuisance. On both counts therefore I think it wiser to recommend that recourse be had to a system which has already proved its utility here, namely the older, but none the less excellent, system of septic tank and percolating filter. If a good plant be obtained in the first instance and properly installed it is practically fool-proof and requires very little attention

Septic tank, purcolating filter recommended.

I do not think that here the initial outlay will be as great as would be that for the bio-æration system and the upkeep would certainly be less.

Given that this is the best method the question arises as to whether all the six townships are to be linked up on one scheme or whether some other arrangement is more desirable as, for example, the installation of a separate system for Curepipe, a single system for Floreal, Vacoas and Phœnix, a single system for Quatre Bornes and a single system for Rose Hill and Beau Bassin.

This is really a question for a Sanitary Engineer and it is largely also a question of rupees.

Doubtless either arrangement could be made a success but no conclusion can possibly be reached until the levels are worked out, information obtained as to the land available for the necessary plants and perhaps also for the disposal of effluent and estimates prepared. Moreover the possibility of utilising to some extent the existing military installations of Curepipe and Vacoas must be borne in mind. It is conceivable that some arrangement might be reached whereby a saving could be effected.

Disposal of effluents.

I have so far spoken of irrigation as a method of disposal but it might be feasible, at least in the case of Quatre Bornes, to pass the purified effluents into water-courses and canals carrying water to the great irrigation reservoir at La Ferme. Much of the supply which reaches this artificial lake is already contaminated and the addition to its waters of effluents which have passed a chemical standard permitting their discharge into natural streams and canals and which possess a certain manurial value would not be specially deleterious. They could be purified bacteriologically by means of small sand filters.

Such a method of disposal would do away with the danger of forming breeding places for mosquitoes which is the curse of all irrigation measures in Mauritius. It would also be more economical unless permission to irrigate land was granted *gratis* and the necessary labour supplied. Certain data

regarding the installation for the camp at Vacoas have been given. With these as a basis one may hazard the opinion, though it is only a very rough guess, that the total cost of sewering the six townships is likely to be somewhere in the neighbourhood of £150,000 taking into consideration the greatly increased cost of material and the high wage rates now prevailing. It must be remembered that every one of the townships is scattered and that it is a much more expensive matter to provide drains for towns of a " garden " character than for those which are of the true urban type. There must be an ample provision of public latrines and urinals throughout the area and all sullage water of an offensive or dangerous type must be admitted to the drains. Rain and storm waters must be excluded and can be dealt with by the existing surface drains and natural drainage channels. It will be found that there are certain localities which cannot be linked up with the main scheme. These will continue to be served by a pail system conducted, however, let us hope, on very different lines to that which at present obtains. The pails, of the same type of those which are being obtained for Port Louis, and which will possess covers, will be taken to dumping depots and their contents discharged into the sewers. They will be cleaned and disinfected at the depots and returned to the latrines which, of course, will be served by two sets of receptacles.

Probable cost.

Retention of pail system in certain areas.

The best way of carrying this important sewage scheme into effect will be to place the whole undertaking in the hands of some well-known firm of sanitary engineers. If the firm can provide its own labour, say from India or South Africa, so much the better for it is clear that it will be very difficult to obtain sufficient labour locally.

Necessity for expert work.

The faults and deficiencies of the Port Louis installation should serve as a warning and as an indication that work of this specialised kind can only be entrusted to experts. The new sewage system in Cairo was placed in the hands of a distinguished drainage engineer who was brought to Egypt from India for the purpose. It would pay Mauritius to follow a similar course for the correct execution of the work is quite as important as the preliminary investigations which determine the nature and extent of the scheme. It is possible that the Estate Camps mentioned in this report will be brought into line with the townships and adopt the water-carriage service.

If not then I recommend the " fuming pit " or smoke trench latrine system, which is now being tested on certain estates, provided it is found to give satisfaction as I think will prove to be the case.

" Fuming pits " system for estates.

It may be useful if I give a brief account of this system which I first saw used in a simple form in East Africa during the war and which has now been elaborated and modified until it has taken its place as one of the best methods for the use of natives. It is cheap, safe, effective, suited to Indian needs and customs and requires very little attention of any kind. It has also the advantage that the latrines can be placed actually in the camps. If it passes into general use it will go a long way towards solving the ankylostomiasis problem in the Colony and should greatly lessen the incidence of dysentery. In my opinion it is much better adapted to the conditions here than the incineration, recommended by the Dysentery Committee for incineration, though excellent in itself, requires very careful supervision and does not get rid of the objectionable pail system. It is only recently that the " fuming pit " has come into prominence so that naturally the Dysentery Committee had no cognisance of it.

Advantages of system.

Short Account of the " Fuming Pit " or " Smoke Trench " System

These latrines are of two types, permanent and temporary. Either may be employed, the chief difference between them being that, in the case of the permanent variety, the building covering them is of a more elaborate type and the pit is emptied at long intervals, say of two years, by means of a small pump, while in the temporary form the covering building is merely a rain-proof and sun-proof hut and the trench is filled up when the contents reach to within 3 feet of the surface. Then a new trench is dug elsewhere and the hut erected over it.

Description of system.

The permanent type is the better, gives less trouble and is cheaper in the long run. In the temporary form the contents can be utilised for manure six months after the trench has been filled up. In the permanent form the contents when pumped out should be buried, as naturally they will consist to some extent of recently passed excreta and urine and may be a cause of ankylostomiasis, dysentery, &c.

Permanent or temporary forms.

In both types the trench should be 5 metres deep, one metre broad and 6 metres long.

At one end of it there is a continuation in the shape of a fire box (see diagram, Appendix III) 1.15 metres in depth and 1.60 metres in length, the

width being the same as that of the trench i.e. one metre. The fire pit and the main pit are then divided by the construction of a masonry or brick or cement concrete wall with a small aperture through which the smoke passes. Dimensions.

At the other end of the main pit it is well to insert a length of chimney pipe to promote a draught and facilitate ventilation.

A hut of one or other type is then built over the pit, the permanent type possessing a roof of thatch with eaves which should project one metre from the wall. A grass hut will serve the purpose in the case of the temporary trench. The trench is then covered in any convenient way, six apertures being left which are lined with corrugated iron and are provided with covers of the same material which have wire handles fixed to them. If desired they can be fixed in position and made to operate as self-falling lids but this is unnecessary if there is an attendant who performs his work properly. It is easy to ascertain if he is doing so by taking a sample of contents by means of a hollow bamboo rod thrust down into the pit. If fly larvæ are found the fire has been neglected or the covers not replaced. Structure.

The floor of the hut in which are the openings is of the ordinary mud-cow-dung type. If desired the openings can be surrounded by little aprons of cement which supply foot rests and are easily cleaned if fouled by excrement.

This type of latrine can be made more popular amongst Indians by running a water-pipe with taps behind the line of holes so that the users can practice lavage. If water is laid on cement aprons should be placed in position or, if preferred, sheets of corrugated iron can be employed. It would be best in the first instance not to supply water until the Indians get used to the latrine as there will then be less likelihood of a nuisance being created and the trench being flooded. In any case the amount of water should be limited As a matter of fact the Indian can bring water with him say from a stand-pipe outside the latrine hut Facilities for lavage.

In the women's latrines smaller apertures should be provided for children.

The fire should be kept going all day and material used which will emit a thick smoke. Cane trash is excellent. So are dried leaves and grass. The hollow bamboo serves not only to detect fly larvæ but indicates how full the pit is and the nature of the contents. The latrines, like all public latrines should be lighted at night. Methods of examining pits.

The pump used for emptying in the permanent form should be light and portable and have a flexible tube which can be passed down the apertures. The emptying process should be carried out in the dry season as it is easier to bury the material properly at that time. The ratio of apertures to users should be 1 to 10; in the case of women and children 1 to 15 is sufficient.

One trench will therefore serve 60 men and, if of the permanent type, can as a rule, continue in use for at least two years. I append a note by Dr. Pearson of Elisabethville in the Belgian Congo who has used these "fuming pits" or "smoke latrines" on a very large scale.

"The fuming pit, properly attended to, is the only form of latrine for natives of which I have acquaintance which is absolutely proof against flies. It may therefore, be placed, as in our compound, actually among the huts themselves.

There is absolutely no bad smell connected with them. Dr. Pearson's conclusions.

They are inexpensive to make and the most inexpensive of latrines to run. One native can attend to the latrines for 1,000 natives with great ease until the time comes for emptying.

Unless smoke is properly maintained it is a very bad form of latrine.

Absolute proof of neglect is shown by the presence of fly larvæ in the pits.

The danger to water supplies may be an objection in some places. Thus in a limestone district, where crevices are common, an infection of the water supply might be brought about. In our compound we have a tube well which reaches water at about 100 feet and which is situated within 40 yards of 2 pits. There is no infection of the water which after one year's use of the pits shows no nitrites, nitrates nor ammonia of any form. There are only traces of chlorine and the oxygen consumed. is .000624 miligrammes per litre."

In the case of many estates in Mauritius the question of fouling of water supplies does not arise as wells are not in general use. At the same time local conditions must be carefully studied before the system is adopted. Much depends on the type of soil in which the trenches are excavated and the level of the sub-soil water.

So far we have been considering the future but what is to be done until the sewerage of the six townships is *un fait accompli?* An effort must be made to carry on the present system in such a way that nuisance and danger

Immediate action.

are reduced to a minimum. The first thing is to alter the latrine seats so that the tubs fit closely under them. This is not a difficult matter. In most instances it is a case of a saw and a few nails for the seats are of the most rudimentary type. The discomfort due to splashing can be obviated by the sytematic use of earth or sawdust. Where possible of course box-

Alteration of seats.

seats with falling lids should be provided save in latrines used by those who practise lavage. In their cases cement concrete platforms are required. If it is impossible to substitute new forms of pails then those now employed should be furnished with covers as has recently been done in Mahebourg at the instance of H. E. the Governor. It must, however, be clearly understood that wooden tubs are quite unsuitable. They have everywhere been abandoned

Type of receptacle.

for properly constructed metal receptacles which can be easily cleaned and are non-absorbent. Hence if money is available a supply of sanitary pails of an approved pattern should be obtained. They last a long time and when no longer required for the six townships will meet a want elsewhere for that abomination, the wooden tub, should be abolished in Mauritius. It is an insanitary anachronism.

Prior claims of school and railway stations.

I would plead specially that the latrines of railway stations and schools be first taken in hand and that sawdust urinals be introduced in these places and also in the public latrines until such time as the water-carriage system has effected a much needed revolution.

An energetic sanitary staff will soon effect improvements in the private and public latrines but there remains the question of transport and disposal of pail contents. The slow-moving ox-cart must disappear. I see the Dysentery Committee recommend motor transport and I heartily agree. The quicker work of this kind is done the better and an effort should be made to carry it out mostly at night or at least at a time when flies are inactive i. e. the very early morning. I need hardly say the removal should take place every 24 hours. In certain institutions double daily removal might be necessary.

Transport.

Motor transport would pay in the long run for it would enable the towns to be grouped for purposes of pail carriage in a way which can never be done if animal transport of any kind is employed, (*vide infra*). Moreover the motor waggons would always come in useful. When no longer required in this area they could be employed elsewhere.

Disposal.

And now as to disposal. The sooner the existing Engrais system is discontinued the better. However well it is conducted it will infallibly breed out flies. In the hands of contractors who know nothing and care less about sanitation it is a menace and a danger to health. I am not prepared to say that the product of properly managed Engrais which under no circumstances is used for manure when green is a source of ankylostomiasis. We possess no data to enable us to pronounce on this question. All we know is that ankylostome larvæ can live for five months in soil provided they can obtain oxygen and moisture. It is possible they die out in Engrais manure if the latter is allowed to become fully ripe. (See however accounts of new work on the subject in my memo of 22.8.21 on conservancy in the Extra-Urban Districts. The larvæ probably survive for a year). That the Engrais are a cause of dysentery there can be no doubt. It has recently been proved that amœbæ can survive for 52 days in human excrements treated in this manner.

Abolition of Engrais system in its present form.

The sugar planters are the persons whom the disappearance of the Engrais system will chiefly affect but they have definitely stated that if its abolition will improve the quality of their labour they will not object to its becoming a thing of the past. I think that assurance can safely be given them. Moreover I would remind them that successful cane cultivation is quite possible without the aid of human manure. In no other sugar-growing British Colony does such a system obtain and yet I venture to think that West Indian, Demerara and Fijian sugars are not markedly inferior to the Mauritian product, famous though it is.

The point need not be laboured for the planters realise the situation. Hence no Engrais contracts should be renewed. As soon as possible another method of disposal of pail contents should be brought into force. What is

Incineration versus Trenching.

that to be? There are only two alternatives: incineration and trenching. If we were discussing a permanency I would consider carefully the claims of the former but, for a temporary scheme, it may be ruled out of court on the ground of expense, for the incineration of night soil on a large scale means costly destructors, much more costly than those designed solely for burning refuse and town sweepings. Provided government land is available trenching on the other hand is cheap. In order to get rid of the risk of breeding flies I do not see why deep covered smoke trenches should not be employed. provided there is no danger of flooding from rains or fouling of water supplies. There need be no risk of fouling water supplies and when the pit contents rise to within three feet or so of the surface the trenches can be filled up and

six months afterwards their contents used as manure. I admit this is quite an innovation. I have never seen it used for communities of the size with which we are concerned but it appears to merit a trial. So does what may be called a "Smoke Engrais," a special modification to which attention will be directed in a later report. (See report on Savanne and Grand Port). If the labour of digging a large number of deep trenches is too great then recourse must be had to the usual method which is being tried on a small scale at Port Louis and on a larger scale at Mahebourg. Provided motor transport is available it would seem reasonable to lay out one trenching ground for Curepipe, Floreal, Vacoas and Phœnix and to allocate another area to Quatre Bornes, Rose Hill and Beau Bassin.

Rules for Engrais.

Where Engrais cannot be got rid off at once the rules devised for their management should be carried into effect. These will be found in Regulation No. 6 of 11th January, 1919.

Scavenging.

Scavenging

Refuse carts should be covered and the refuse should be burned in destructors. Here again motor transport would mean a great saving in time and a mitigation of nuisance but I admit that it is not so necessary as in the case of night-soil removal. Still Mauritius has the money to inaugurate a first class service so why not be up-to-date?

As a general rule the most modern and efficient method is the cheapest in the long run, looking at the matter merely from the standpoint of the rupee.

If motor transport is provided the grouping of towns mentioned under conservancy might hold good for refuse, there being two large destructors, one for each group. The Horsfall is a suitable form.

Water supply.

Water Supply

Little need be said in this connection so far as sanitary works are concerned. Happily there are no "regards" in any of the six areas. Steps should be taken to prevent the constant waste of Mare-aux-Vacoas water. This necessitates more frequent inspections and a larger supply of self-closing taps. I suggest that the aid of the police be sought in this matter. If they made regular rounds and reported all defective taps and fountains the labours of sanitary inspectors and guards would be lightened and more speedy action could be taken.

Speaking of Mare-aux-Vacoas water there can be no doubt that, from a hygienic point of view, it is a mistake to supply any of this priceless commodity to the irrigation reservoir at La Ferme. It should be all reserved for drinking purposes. There is I believe another side to the question but this it is not my province to discuss. It may of course be possible to tap the Rivière du Poste, increase yet more the capacity of the Mare-aux-Vacoas reservoir and have sufficient pure water for all demands and also for La Ferme.

The question is one which at present concerns Port Louis more than the area under consideration, but it may require consideration if the sewerage scheme develops as some 200,000 gallons of water per diem will be required for the water-carriage system.

At Beau Bassin it may be necessary to supply Mare-aux-Vacoas water throughout the whole locality. This means considerable pipe extension and the erection of public fountains. The same is true of Quatre Bornes.

Pipe extensions.

The closing of shallow wells at Curepipe also necessitates similar works but not on a large scale. Minor works of various kinds have been indicated in the body of this report and it now appears desirable to give a list of the suggestions made.

Summary of Recommendations.

Summary of more Important Recommendations.

1. Reorganisation of Sanitary Administration and abolition of dual control.

2. Appointment of Medical Officer of Health for the whole area. Lectures to be delivered by the M.O.H.

3. Appointment of two qualified Sanitary Inspectors.

4. Increase in number of local Sanitary Inspectors.

5. Improved pay for local Sanitary Inspectors who should serve one Department only.

6. Institution of Examining Board for Local Sanitary Inspectors.

Need of maps and reference books for sanitary inspectors.

7. Sanitary Offices to be provided with up-to-date maps and books of reference. I find some have no maps at all and in other cases only old and defective maps are available. Books of reference are conspicuous by their absence. A copy of "Muirhead's Tropical Sanitation" should be in every sanitary office and there are other essential works, a list of which I hope to submit.

8. Installation of water-carriage system of sewage for the whole area. (Method of sewage disposal discussed).

9. Pending such installation reorganisation of existing system of conservancy with introduction of metal sanitary pails, motor transport and trenching. Reconstruction of latrines and urinals and abolition of Engrais.

10. Establishment of "fuming pit" or "smoke trench" system in Estate Camps and possibly also in Indian villages.

11. Closing of all shallow wells in the Curepipe area.

12. Extension of Mare-aux-Vacoas water supply where necessary and more especially in Beau Bassin and Curepipe. Self-closing water taps to be generally employed to check waste. Protection of water supply at La Caverne.

13. Reconstruction in cement concrete of certain surface drains notably in Curepipe. Erection of "Field" flushing tanks for drains in certain localities.

14. Greater use of properly constructed absorption pits provided with grease traps or boxes as a temporary measure pending completion of sewerage.

15. Provision of public and private dust bins. Motor transport and destructors for refuse and town sweepings.

16. Erection of small markets at Quatre Bornes and Vacoas and improvements in existing markets.

17. Bake-houses and aerated water factories to be brought under new regulations.

18. New public slaughter house for Curepipe. Abolition of private slaughter house.

19. Recommendations to be posted up in hairdressers' shops.

20. Old abandoned cemetery Rose Hill to be converted into a recreation ground if no other land available.

21. Anti-mosquito measures i.e. provision of special flower vases, for cemetery, Quatre Bornes.

22. Provision of a cemetery for Curepipe.

23. Remodelling of Metcalfe village with segregation of cattle and goats.

24. Improvement in camp lines. (For further consideration).

25. Abolition of slum areas, Curepipe. This may be effected by reconstruction or by expropriation and housing the inhabitants elsewhere. The latter which is the method favoured by the Town Architect would be expensive, costing roughly Rs. 250,000 but it would certainly be the most effective way of dealing with the situation. At the same time there is a good deal of space available in each of the areas and it would, I think, be possible to carry out housing schemes on the spot. The whole question, however, is one requiring careful discussion. Measurements will have to be taken, estimates prepared, and the responsibility of the landlords considered.

The urgent need for laundries.

26. Provision of laundries. This has not been discussed so far as no laundries exist, but it is most important in order to check the perpetual fouling of the fine hill streams and rivers in the area. As Chadwick said long ago it is admittedly difficult to wean the dhobie from his affection for running water but it is possible that if he were given every convenience in a simple type of laundry, he and also the Indian women, might eventually take advantage of it. The building I have in mind is a covered corrugated iron shed with open sides and a cement concrete floor. Water should be laid on and other facilities provided. The effluent could be purified by lime before admission to the stream or river. Large field laundries of this kind were extensively employed in the various war areas and there is no reason why they should not be established in Mauritius. I consider they should form a charge against the Improvement Fund.

27. Continuance of present anti-malarial works in this area more especially repair of the raised portion of the Terre Rouge Canal and insertion of flushing sluices in certain dams.

28. Greater stringency in general anti-mosquito measures. Action to be taken under new regulation if latter approved.

29. Reconstruction of several school buildings and special and early attention to the sanitation of schools. Revision of method of teaching hygiene. Establishment of small sanitary demonstration centres. Instruction as regards cooking and clothing.

30. Special and early attention to the sanitary state of railway stations. Station Masters to be made responsible for the sanitary state of stations under their charge. Improvement of Railway camp, Curepipe.

31. Prevention of watering manure at or near railway stations.

32. Provision of facilities for disinfection throughout the area. Introduction of portable steam sack disinfectors.

33. All building plans to be submitted to the Sanitary Authority for approval.

34. Prohibition of cane growing within township areas except in places well removed from inhabited houses.

35. Seriousness of sanitary offences to be impressed on Magistrates and punishment adapted to fit the crime.

In concluding this report I have again to express my indebtedness to Drs. Komplé and Castel and also to Dr. Chauvin, acting Sanitary Warden of the District, who, it is but fair to state, has only recently been appointed and who is not a full-time officer. Mr. Salece the Sanitary Inspector at Curepipe kindly prepared a special map for me and furnished me with useful figures. To Mr. Pitot, the Secretary of the Beau Bassin–Rose Hill Board ; Mr. Leclezio, the Chairman of the Board of Quatre Bornes, Dr. Edwards C.M.G. and Mr. Marion de Procé, respectively Chairman and Architect of the Curepipe Board of Commissioners I tender my sincere thanks for the interest they took in the enquiry and the help and information they gave me. All these gentlemen accompanied me during my inspections of their districts and in certain instances suggestions put forward were speedily carried into effect.

I have the feeling that there was a genuine desire to get something done and this is a hopeful sign.

A statement may fittingly be recalled, made as long ago as 1872, by one of the wisest of British statesmen. In a certain famous speech Disraeli delivered himself of these words :

" A great scholar and a great wit, 300 years ago, said that, in his opinion, there was a great mistake in the Vulgate, (the Latin translation of the Holy Scriptures) and that, instead of saying, " Vanity of vanities, all is vanity," " *Vanitas vanitatum omnia vanitas*," the wise and witty King really said, " *Sanitas sanitatum, omnia sanitas.*" Gentlemen it is impossible to overrate the importance of the subject. After all the first consideration of a Minister should be the health of the people."

I would go even further and say that it should be the first consideration of the people themselves.

I have the honour to be,
Sir,
Your obedient servant,
ANDREW BALFOUR.

APPENDIX I.

GOVERNMENT HOUSE,
PORT LOUIS,
June 6th, 1921.

No. 129/R/

ST. JEAN CEMETERY, QUATRE BORNES

SIR,—Last week I visited St. Jean Cemetery at Quatre Bornes. Here, as in the Port Louis cemeteries, vases are placed on the graves and in the majority of cases I found the water in these vases swarming with the larvæ and pupæ of mosquitoes. Adult mosquitoes, chiefly *Stegomyia albopicta* were exceedingly numerous and, when making the examinations, it was not uncommon to find that half-a-dozen of them had settled upon one's clothes with a view to blood-sucking. It is little use carrying out anti-mosquito measures elsewhere if this serious nuisance is allowed to persist. I have spoken to Monsignor Lee on the subject and he has promised to help but I would be glad to know what progress has been made with the scheme mentioned in my 22/R/5 of April 11th.

Since the memo was written thousands of mosquitœs must have hatched out and so it will continue until some definite action is taken. Delay in anti-mosquito work is greatly to be deplored. The speedier the action the greater the possibility of abating the nuisance and danger to health.

I have the honour to be,
Sir,
Your obedient Servant,
A. B.

THE HONOURABLE.
THE COLONIAL SECRETARY.

NOTE.—It is now September, 1921 and nothing has been done.

APPENDIX II.

REPORT ON ANKYLOSTOMIASIS MEASURES IN SUMATRA

(Dr. G. Baermann)

"Three estates which, in spite of all recommendations, refused to adopt these measures (*vide infra*) had, in the course of the last 2½ years, 4,657 admissions to hospital. Three estates with the same labour force which did adopt these measures had 1,034 admissions showing a difference of 3,623.

"Assuming one admission comprises 22 days of treatment (average in 1918), reckoned at 50 cents a day, then this shows a loss of about 40,000 guilders for this period alone.

"The number of lightly infected (ankylostomiasis) coolies

on insanitary estates was	310
on sanitary estates	20

The number of badly infected coolies

on insanitary estates	10
on sanitary estates	3

All sanitary estates show 1.8 % of coolies sick.
Insanitary estates show 3.0 % of coolies sick.

"I must not omit to once more repeat the important measures for combating ankylostomiasis.

(1) "The coolie lines must be clear of all cultivation for a space of 25 metres. (Rubber trees within this distance must be cut out or the branches pruned).

(2) "Floors of the rooms, verandahs and drains must be bricked and cemented and on the far side of the 'drain' a border of 50 cm. wide must also be of brick and cement.

"In the case of coolie lines built 2 to 4 feet above the ground only the space between the door and the drain need be cemented. The space under the floor should be surrounded with barbed wire or other form of fencing to prevent it being used in any way whatever.

(3) "All water tins must be placed in the cemented room, on the verandah, or over the drain. They must not stand on the uncemented ground.

(4) "All coolie lines must be provided with a latrine built to a special design and, if possible, be connected with the coolie line by a covered way.

(5) "Each coolie line must have a good watchman, who must remove all weeds and wash down the drains and latrines daily.

(6) "Each assistant must inspect his coolie lines daily.

(7) "Very pale coolies should be sent to hospital for immediate treatment.

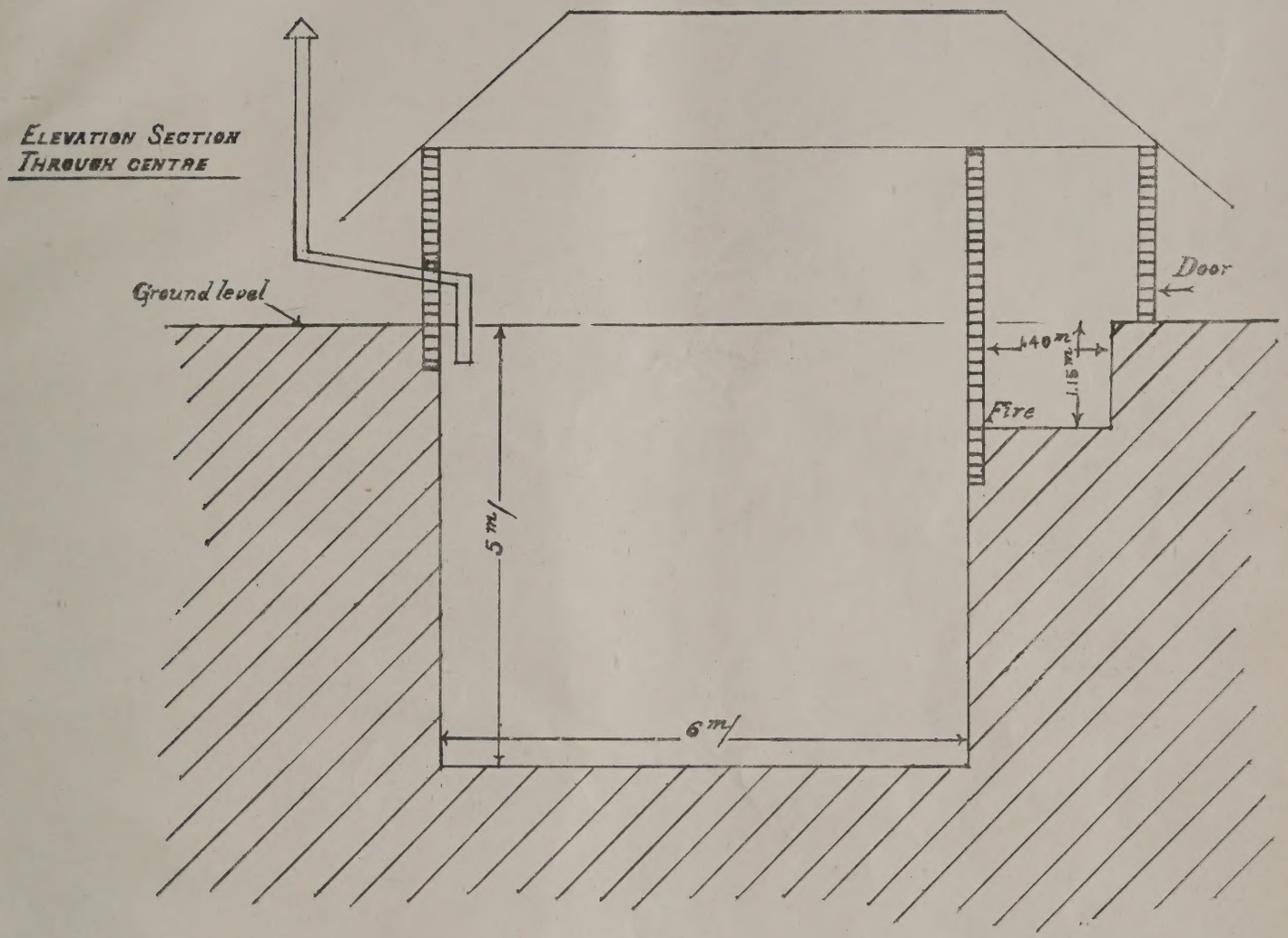
(8) "Regular worm cures according to the amount of infection which will be determined by an annual inspection of all coolies.

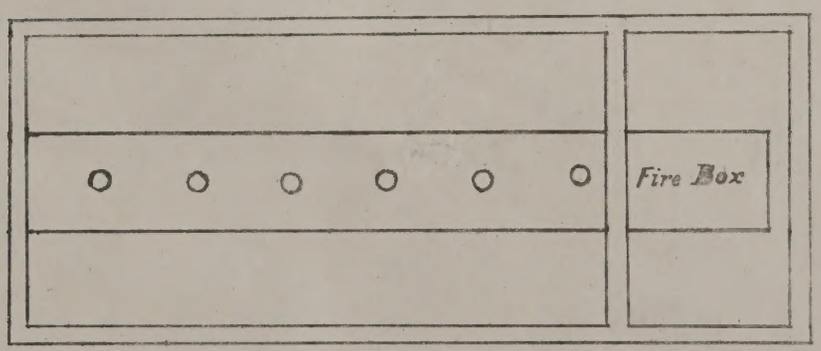
"By means of these measures during the period 1906–1918, the number of first class coolies has risen from 35 % to 90 %. The number of medium infected coolies has fallen from 50 % to 10 %.

"The number of severely infected coolies has fallen from 15 % to 0.5 %."

APPENDIX—III.

—FUMING PIT—





Ground Plan

Ventilating spaces in walls not shown
Each long wall has at least 8 spaces 6" square beneath the eaves

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